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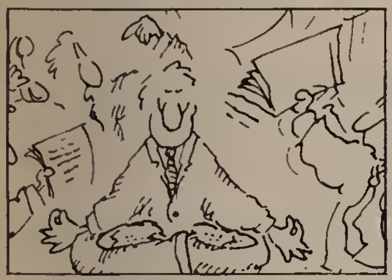

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NEWSPAPER

Honeywell shakes up info group

By Clinton Wilder

MINNEAPOLIS — Anticipating the merging of its computer business with NEC Corp. and Groupe Bull, Honeywell, Inc. last week reorganized the domestic portion of that business to focus on big-ticket integrated systems sales to new accounts.

Honeywell restructured its Information Systems Division along functional rather than product lines, combining the product operations, marketing and sales of its Large Computer Products Division with its Small Computer and Office Systems Group. The reorganization apparently will make it easier to combine the computer business in the forthcoming joint venture with Japan's NEC and France's Groupe Bull.

Honeywell has said it hopes to finalize the NEC-Bull agreement before the end of the year [CW, Sept. 29].

"The things we are doing right now are in concert with what we're going to be do-

See **HONEYWELL** page 4

VAX boom triggers hiring war

East Coast VMS workers enjoy seller's market

By Donna Raimondi

A costly shortage of programmers trained to work in the Digital Equipment Corp. VAX VMS environment has hit New York and Washington, D.C., and is spreading to other parts of the country.

The dearth of qualified programmers has ignited placement wars in which high salaries and a variety of bonuses help the sought-after programmer decide where to work. "It is difficult to hire experienced and capable VAX people," says Stanley Rose, vice-president of distributed processing technical support at Bankers Trust Co. in New York. Bankers Trust has 48 VAXs ranging from Microvax IIs to 8700s, and the problem has become worse in the past 18 months, Rose says.

Part of the New York dilemma is attributable to DEC itself, according to David O'Flaherty, senior vice-president of client services at New York's American Data Search and Management Consultants, Inc. "DEC is trying to hire these programmers away from the open market as the company goes heavily into sales and marketing efforts," he says.

But competing with the banking industry — the single largest user of VAX programmers these days, according to city placement firms — is a tough job. In order to ensure that they get the most qualified people, O'Flaherty says, some banks are offering bonuses such as 15 or 30 weeks' pay and in at least one case, a 100% bonus at the end of the year, effectively doubling the salary.

DEC also suffers

DEC is in strong competition for VAX programmers, agrees a spokesman for the company. "We are having difficulty finding all the ones we want to hire, at least in the New York/New Jersey area," he admits.

The programmers, destined for sales and service support in field units, must have strong technical, networking and computer industry backgrounds as well as personal and communications skills and four to five years' experience, the spokesman says. Anyone with those qualifications will most likely get good offers plus a signing bonus from banks — deals that DEC cannot always match, he adds.

VAX programmers, both applications and systems, can easily find jobs in both Manhattan and Washington, D.C., says Joan Bernstein Gabel, head of data processing recruiting at Robert Half International, Inc. in New York. "VAX is getting a large foot in the typically IBM door here in New York, and in Washington, there is a tremendous amount of DEC equipment in government and research and engineering firms," she adds.

Companies that have trouble finding qualified people through local advertising or personnel agencies are now doing in-house training, recruiting at user organizations or placing ads in national magazines, she says.

The high demand for VAX programmers is spreading to smaller Midwestern areas as well, says Cathy Heinen, computer recruiter at Executive Research, Ltd. in Des Moines, Iowa, who recruits nationally. VMS programmers are pulling in higher salaries now than they were

See **VAX** page 9

Antibypass plan killed

By Mitch Betts

WASHINGTON, D.C. — The Federal Communications Commission last week turned down Nynex Corp.'s controversial plan to restructure access charges, a proposal intended to discourage large customers from bypassing its switched network.

Although the Nynex plan would have provided volume discounts on switched-access costs as an enticement for large users to stay on the local switched network, business users supported the FCC decision. Users groups strongly opposed the Nynex plan, largely because it paid for the discounts with a surcharge on private line, or special access, connections.

"The key reason for our opposition was that the surcharge proposal was a dramatic step away from cost-based pricing for our private data networks," said Brian R. Moir, counsel to the International Communications Association, the largest users group.

Users also said Nynex had failed to document a serious "bypass threat" to its switched network that would justify the departure from existing access charge rules.

The FCC rejected the Nynex plan on grounds that, although it would have served Nynex interests, the holding company did not persuasively show that the scheme was in the public interest.

In essence, the FCC said the Nynex plan was not demonstrably better than the

See **ANTIBYPASS** page 6

CW SPECIAL REPORT

Action in printers moves to departmental work groups

By James Connolly

Users of minicomputers and networked personal computers stand to benefit from added functionality and lower prices as nonimpact printer vendors shift their attention away from the fiery workstation market and toward the next level of performance.

Stabilization of the mainframe printer market and a saturation of the low-end workstation arena mean that makers of laser-based and other nonimpact printers will look to the middle range of the printer market, where their products can be used as shared resources for networked microcomputers and minicomputers, according to analysts and vendors.

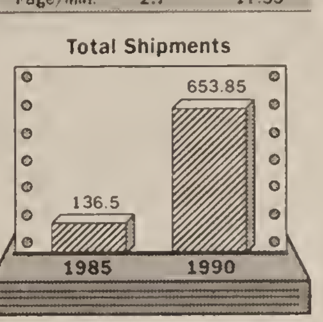
It was in the entry-level market that Hewlett-Packard Co. and its OEM supplier, Canon Ltd., made a breakthrough two years

See **PRINTERS** page 12

Page printers
Unit shipments in thousands

	1985	1990
0-20 Page/Min.	131.6	618
21-43 Page/Min.	2.2	18.5
44+ Page/Min.	2.7	17.35

Total Shipments



Information provided by Datek Information Services Inc. Megatrends, 1986 report

The cost of Reagan data alert

Policy implementation limited by resources

By Mitch Betts

WASHINGTON, D.C. — The Reagan administration's latest information security policy is expected to nudge federal MIS managers toward encryption for data communications, upgraded security software and an overall reappraisal of their security programs.

ANALYSIS

But the success of the new policy may hinge on the mundane question of where to get the money to pay for better security.

Last month, the administration issued a memo ordering federal agencies to identify and protect data that is "sensitive but unclassified" in the interests of national security [CW, Nov. 24]. The memo by John M. Poindexter, the president's former national security advisor, is the latest in a series of directives, statutes, audits, reports and circulars that recommend or require better computer security at federal agencies.

Secured from enemy spies

In essence, the latest memo adds to the pile by directing that a variety of economic, technical and personal data should be secured from access by enemy spies, such as intelligence agents of the Soviet Union.

Numerous security audits show that federal agencies need to beef up their security efforts, but the agencies often lack the commitment, money and personnel necessary to implement reforms, according to a recent report by the U.S. Congress's Office of Technology Assessment (OTA).

About 40% of the agencies have not conducted a risk analysis in the last five years, 25% do not screen personnel with computer access, 40% do not use audit software or restrict dial-up access to mainframes and 80% do not use encryption, the OTA reported.

Furthermore, 50% of the agencies that OTA surveyed do not screen computer applications for the sensitivity of their information. At minimum, the Poindexter memo should prompt agencies to thoroughly reevaluate their security programs.

"Fundamentally, it's an information security policy, not a computer security policy," says F. Lynn McNulty, director of information systems security at the U.S. Department of State. "So I think people have to back up even more and take a look at what kind of data is being processed on the systems and see whether or not it meets the definition of sensitive-but-unclassified data," he explains.

"So before we start spending any money on security gear, we've got to take a look at the information and make some fundamental information security policy decisions," McNulty adds. "For example, is a dial-up modem compatible with protecting this information?"

But when asked whether federal agencies will actually implement the Poindexter memo, security officers generally say they will implement it "with available resources." That means officers will improve security if they have the money to pay for it.

As OTA's report puts it, "If given a choice between spending resources on security measures or spending those resources on features or staff to enhance the performance of an information system, most managers would choose the latter, especially in a climate of tight budgets."

Agency officials say the only enforcement mechanism for the Poindexter memo is the prospect, in fact the likelihood, of congressional scrutiny and more audits by the General Accounting Office.

The congressional scrutiny, probably from the House of Representatives' Committee on Government Operations, is also likely to address the question of whether enhanced computer security will restrict access by U.S. citizens and researchers to government data bases.

The American Civil Liberties Union fears that agencies will stop putting government research reports in the National Technical Information Service public data base, stop sending government statistical reports to libraries across the country and increase the hassle of getting Freedom of Information Act requests fulfilled.

Or, at the other end of the spectrum, the Poindexter memo may simply boost the security of government computer files that U.S. citizens do not have direct access to anyway.

Unprotected Autocad to ship

SAUSALITO, Calif. — Responding to widespread user criticism, Autodesk, Inc. said last week it plans to discontinue its hardware lock used for copyright protection.

The vendor also said it will begin shipping unprotected versions of its Autocad software at no charge to those users with protected versions.

"I'm really pleased about this because of the problems we've had with the lock," said Rodger Marx, a staff engineer in the materials handling and systems division of Caterpillar, Inc. "I believe software protection is good to protect against the hackers. But there were a lot of legitimate users who were inconvenienced."

Autodesk has been shipping its software with the hardware protection device since June. Company officials said they were "astounded" by the number of users who challenged this policy.

"Our users tell us they don't like our protection device, so we're removing it," said Alvar Green, Autodesk president. "We're tired of debating the morality when the real point is providing the best tools to improve productivity."

Marx said the lock often caused his system to malfunction.

"Occasionally, fatal error messages would flash on the screen, and my program would be terminated," he said. "So you'd have to go in and reboot."

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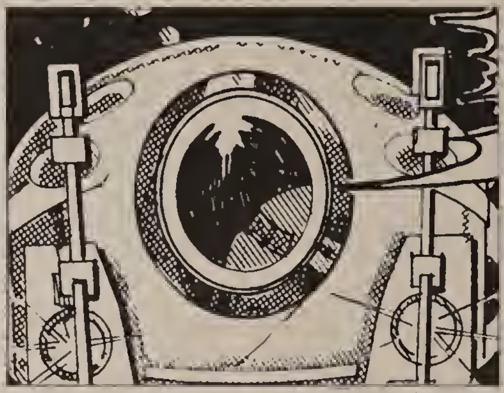

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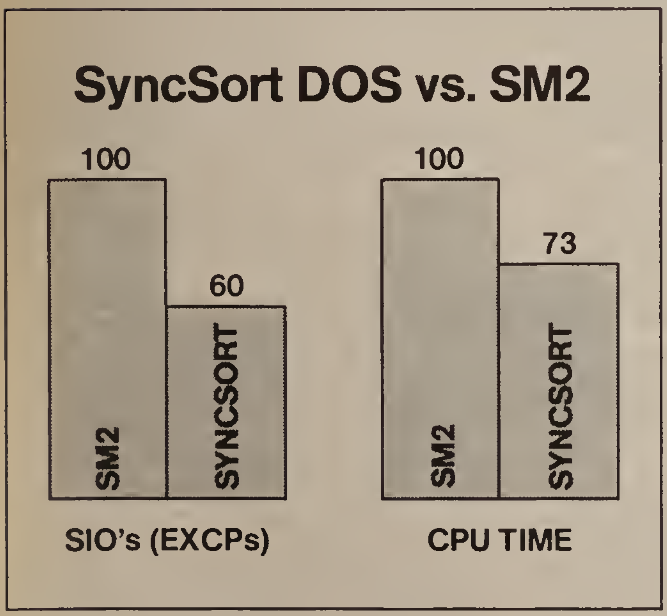

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Vendors overhaul systems to match tax law

Insuring ex-workers poses payroll problem

By Charles Babcock

Federal tax reform and legislation that extends health insurance coverage to former employees are forcing companies to adopt changes in their human resource and accounting systems, according to software and accounting analysts.

The tax reform, signed into law in late October, imposes a number of changes, including a reduction from $30,000 to $7,000 of the maximum income deferrable under 401K savings plans.

The Consolidated Omnibus Budget Reconciliation Act of 1986, or COBRA, offers an even greater challenge by extending health insurance coverage for departed employees for up to 18 months. Since employers must track ex-employees who have been terminated and collect payments on continued health insurance coverage, the changes needed are often "beyond the scope of traditional human resource systems," said Rochelle O'Hara, an analyst with Arthur Andersen & Co. in Chicago.

If an employer wishes to reconcile payments to insurance carriers with contributions by employees, he may no longer simply match payroll deductions to payments. He must find a way to include the payments by COBRA-covered employees as well, she said.

Both changes in the law take effect Jan. 1, and the penalty for noncompliance is the potential loss of the tax-free status of employee benefit and deferred income plans, O'Hara said.

Employers who are using lines of products that offer integrated development and reporting tools can make the changes more easily than those dealing with homegrown or standalone systems, O'Hara said. But they may still find they need to integrate data from sources not part of the integrated software in order to meet new federal reporting requirements, she added.

Documentation on changes

One software vendor, Management Science America, Inc. (MSA), has sent out documentation to its accounting and human resource system customers on how to implement the changes in existing systems. No upgrade tapes or other forms of source code changes need to be installed, said spokeswoman Denise Fields-O'Connor.

MSA provides reporting capabilities in its product line that meet the existing federal requirements, she said, although those requirements are likely to become more complicated in future legislation.

McCormack & Dodge Corp. (M&D) customers can also use existing tools to meet the COBRA requirements, said Patricia A. McCay, M&D human resource product marketing manager in Huntsville, Ala. Under existing systems, a personnel department user can set new parameters for a tax program through entries in tables on a screen. The user may also define new data elements on screens to create ex-employee tracking files and to keep track of payments to insurance carriers, she said.

Since the benefit extension covers a spouse, an ex-spouse in cases of divorce and children, including children who have married, it is important that the human resource systems be flexible in design and accompanied by tools for making changes, McCay said.

Weighting deferred income plans

One goal of the tax legislation was to make certain that deferred income plans, such as 401Ks, are not weighted heavily in favor of the top one-third of employees in income. The tests for discrimination have been stiffened in the law, and employers widely anticipate that reporting requirements will soon be stiffened as well.

"As we look out toward 1988 and 1989, the discrimination testing rules in the tax law will be applied more broadly," O'Hara said.

"Employers will be required to track benefit participation and the cost and value of benefits offered to each employee," O'Hara predicted.

Honeywell info group reorganizes

From page 1

ing," said Eugene Manno, former head of the small computer unit, who was transferred to a senior direct-sales position. "We're all kind of anxious to get on with it, since we are strictly in the computer business, as opposed to the diversified businesses of Honeywell. We will be better able to compete with the likes of IBM and DEC, which are strictly computer companies."

Another sign that Honeywell is preparing to shift its direct corporate focus away from computers was its recent agreement to purchase the former Sperry Corp.'s Aerospace Division in Phoenix for $1.025 billion [CW, Nov. 17].

"Honeywell will be a joint venture partner in the computer industry and be directly active in the defense, building controls and factory automation businesses," said Gary Blauer, an analyst with Minneapolis-based Dain Bosworth, Inc. "That appears to be their current plan."

If concluded by year's end, the NEC-Bull combination will add to what has already been a turbulent year for the traditional BUNCH. Burroughs Corp. and Sperry Corp. have merged to form Unisys Corp., while NCR Corp. has continued de-emphasizing its traditional mainframe business in favor of departmental and transaction processing systems.

Honeywell's computer business has been a depressed part of the company in the last two years, and E. F. Hutton & Co. analyst Michael Geran estimates that the unit's operating profits will tumble 50% in 1986. "They have to do something," Geran said. "When the moves are over, it will be a totally different company."

Jerome J. Meyer, Honeywell's executive vice-president of U.S. information systems, insisted that last week's action was unrelated to the ongoing negotiations with NEC and Bull. "It doesn't send a signal either way," he said. "While there are people negotiating, the business has to run, and we believe these changes are what is needed now."

Meyer said Honeywell will become more aggressive in winning new customers, particularly in IBM mainframe-based MIS shops. "The fact that a customer has an IBM mainframe is not something that should turn us away," he said. "I'm not sure we have been as well coordinated in going after that business as we should have been."

The changes will enable top executives like Manno and Vice-President Paul Byrns to make sales calls to their counterparts on the user side. "For a complex integrated system sale with a long decision cycle, the best technique is brass on brass," Manno said.

In a related move, Honeywell also reshuffled its Massachusetts-based small computer operations, vacating five facilities and moving 2,500 employees to a consolidated facility in Andover, Mass. Although no layoffs are planned as a result, a spokesman said the company may not replace all employees who leave or retire.

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New Dimensions in Software Productivity.

Rocky start for merged AT&T units

Users give mixed reviews to service

By Stanley Gibson

Edward Hodgson was surprised earlier this year when AT&T workmen showed up to install modems. AT&T had not yet put in the necessary data lines, and the installers had to return to headquarters without doing any work.

That incident — at Westinghouse Electric Corp.'s Livingston, N.J., computer center, where Hodgson is manager of computing and communications — and another similar occurrence at a major East Coast AT&T account, took place prior to the June 1986 merger of AT&T Information Systems with AT&T Communications.

The merger was intended to reduce communication lapses between the two divisions. AT&T Information Systems sells computers and customer-premises equipment such as modems and private branch exchanges (PBX). AT&T Communications provides telecommunications lines and services.

Although users report fewer such fumbles of late, many report the benefits of the merger have yet to be fully realized.

"The real focus of the consolidation is not customers but AT&T employees asking themselves, 'Do I still have a job? Who am I working for?' So our service level is slipping," observes Kenneth Jankowski, manager of network services at TRW, Inc. "The critical point for large customers like us is that we're willing to pay a premium price as long as we get premium service. But there has been a drop in service level, and I don't think this problem will go away after the reunification is complete."

While AT&T Information Services has faced a competitive situation since divestiture, AT&T Communications has been "fat and profitable because they've been a monopoly until recently," Jankowski says.

Jankowski thinks these internal conflicts — coupled with the fact that AT&T's competitors, MCI Communications Corp. and U.S. Sprint Communications Co., are becoming more viable carriers with extensive fiber-optic networks — are going to make AT&T less attractive to large users like TRW.

One reason for the merger was to relieve customers from having to deal with four contact points: an account representative and a service manager from each of the two divisions.

Following the merger, AT&T began to offer joint marketing teams for the largest 10 accounts in the nation. The number of accounts has now swelled to 370, according to AT&T. Under the new plan, customers are supposed to have one account representative and one service manager.

Despite the promise of only one account representative and one service manager, Westinghouse's Hodgson says he still has two account representatives but only one service manager. And, like Jankowski, Hodgson says the two AT&T units, nominally merged, sometimes have difficulty working together.

"They have had an internal communication problem between the two units," Hodgson says. "The past couple of months it's been in turmoil. People have been worried about whether they would still be there or not," he says.

However, Hodgson is optimistic about the long-term results of the merger. "Early next year, we are going to see something good happen. I look forward to it. They shouldn't have split apart in the first place," he says. Meanwhile, the reportedly poor financial performance of AT&T Information Systems is of no great concern to him. "They're going to persevere. They know how to make money," he says.

> ”
>
> *'There's still a lot of internal squabbling. There is political warfare among personalities. Egos are getting bruised.'*
>
> — Bill Rahe
> The Gartner Group, Inc.

AT&T spokesman Barry Campbell acknowledges that revenue from AT&T Information Systems units is lagging. "It's pretty clear the major profit is coming from communications. We're anxious to improve profitability of the customer premises equipment side," he says, referring to efforts to trim staff.

Campbell says that for several months his company has been offering to a number of employees incentives to leave, such as cash bonuses and early retirement. Last year, AT&T Information Systems eliminated 24,000 jobs.

Marty Gruhn, vice-president of The Sierra Group in Tempe, Ariz., says some 25,000 to 30,000 workers will be laid off. "We're getting a bad sense that AT&T is in real trouble," she says.

Campbell, however, says specific layoff figures can only be guesses. He says a total can be arrived at after the incentive program is over.

At least one user finds little to complain about in his dealings with the telecommunications giant, even when the two units were separate. Although he now deals with only one AT&T account representative, he says that even when there were two account teams, there was no confusion. "Each of the two understood their position. There was no cross-sell," says Trav Waltrip, vice-president of telecommunications at The Travelers Corp. in Hartford, Conn.

"The progress has been great. The account team is totally integrated. Before, if we had a message for AT&T, it meant two calls. Now we make only one. It's more convenient," he adds.

Waltrip says his good results are due to The Travelers' list of telecommunications standards. For example, the company uses standard T carriers and has standardized on AT&T System 75 and System 85 PBXs. Having a clear idea of the company's needs makes buying from a vendor of any kind easier, Waltrip contends.

Another telecommunications manager for a major financial services corporation in New York, who asked to remain anonymous, similarly asserts that his company's size helps it in dealing with AT&T. By being able to hire qualified network personnel, the company is less dependent on the vendor for advice. In the last two years, his company has gone from eight to 35 people in project engineering, the user says.

"The days of relying on a vendor for all decisions are over," he stresses, adding, "We've been pretty clear in determining our needs and in defining our architecture. For example, if we want very small aperture satellite terminals, we go after them."

The user has detected restlessness among AT&T people due to personnel reshuffling. "There was uneasiness about who gets what position in the combined unit and whether there would be more layoffs. They're scared to death," he says.

"There's still a lot of internal squabbling. There is political warfare among personalities. Egos are getting bruised," says Bill Rahe, a telecommunications consultant for the Gartner Group, Inc., a Stamford, Conn., research company.

John McQuillan, president of McQuillan Consulting in Cambridge, Mass., voices similar views. "These are two of the most political organizations there are. Instead of pulling together, maybe some people are digging in," he says.

Divested Bells unshackled on equipment, net service

By Mitch Betts

WASHINGTON, D.C. — The Federal Communications Commission last week eliminated the requirement that the divested Bell operating companies sell terminal equipment through subsidiaries that are separate from their network services.

In a final order that lifted the structural separation rule, the FCC said the Bell operating companies can provide customer premises equipment to end users in any manner they choose, so long as the equipment is not bundled with the network service offerings and the companies meet a variety of nonstructural safeguards intended to prevent anticompetitive actions.

FCC officials said the order, first proposed last March [CW, March 17], responds to customer demand for integrated communications systems. By early 1987, the 22 divested Bell operating companies will be able to combine the marketing of customer premises equipment and network services.

Brian R. Moir, counsel for the International Communications Association, the largest business communications users group, said he was heartened that the FCC agreed to many of the suggestions users made for strengthening the nonstructural safeguards. He said users, however, are not convinced that it is wise to remove the structural separation requirement because of the Bell companies' monopoly in local markets.

"If the FCC is going to take the step, at least they put some safeguards in there that are better than none at all," Moir said.

The FCC said five types of safeguards must be in place before the regulatory relief can be fully implemented at the Bell operating companies, a provision that users groups have urged.

The safeguards required by the FCC are accounting measures to detect and deter improper cross-subsidies, provide nondiscriminatory access to network services, share customer network information with other equipment vendors if the customer approves, disclose changes that affect equipment interconnection and permit independent equipment vendors to act as sales agents for Bell network services.

Antibypass plan killed

From page 1

current access charge system.

The FCC encouraged local carriers to file alternative plans that would give them some means of flexibility in recovering costs from users and prevent uneconomic bypasses of the local switched networks.

Nynex proposed an alternative access charge plan that, in addition to the discounts and surcharges, would have shifted the cost of the local portion of long-distance calls from long-distance carriers to end users.

Donald B. Reed, Nynex's vice-president for federal relations, said Nynex is encouraged that the FCC recognized the need to address the issue of setting prices that more accurately reflect the cost of providing service.

"Our plan's tapered-rate schedule for large-volume custumers was designed to stimulate use of New England Telephone and New York Telephone's networks, thereby protecting the investment in these facilities, which will benefit all customers in the long run," Reed said.

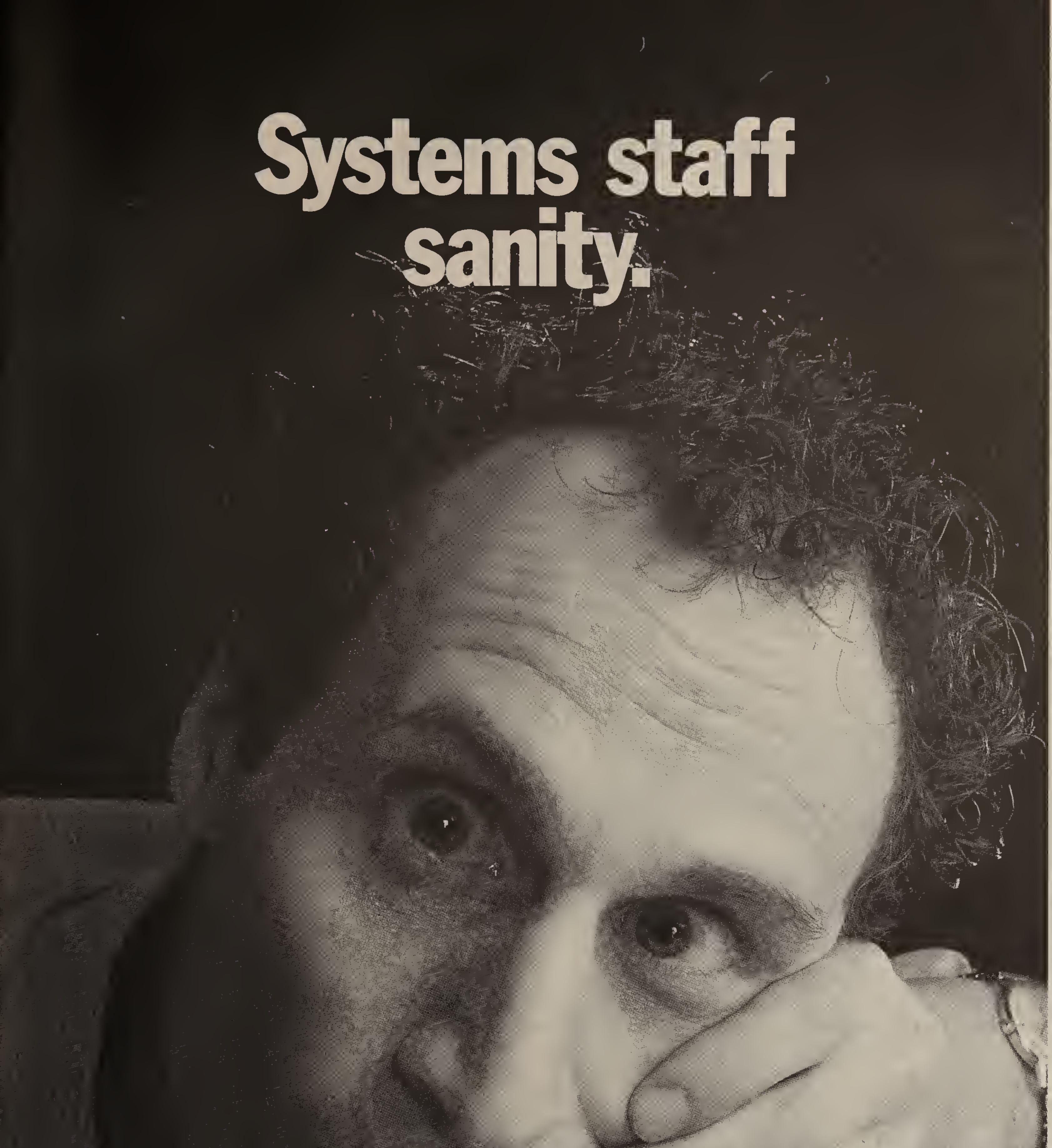
DEC links mini, tape backup

MAYNARD, Mass. — Digital Equipment Corp. last week announced that its TU81-Plus tape drive, formerly available only for larger systems, will be supported on the its Microvax II minicomputer.

The tape subsystem is the first tape drive providing direct connections to DEC's VAXBI bus as well as to the DEC Unibus. The subsystem had previously been supported only by medium-scale and larger members of the VAX family.

The subsystem was designed for applications requiring sustained I/O such as disk backup, data archiving or data interchange. DEC product marketing manager Malcolm S. Krongelb claimed that the TU81-Plus, with a 256K-byte cache buffer provides three to five times the performance previously available on tape systems for the Microvax II.

The TU81-Plus costs $25,500 for the Microvax II and $27,500 for VAXBI-based systems.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First HP Spectrum 840s set to go on-line; 930 on hold

Support 60 users concurrently

By Jeffry Beeler

CUPERTINO, Calif. — The first fruits of Hewlett-Packard Co.'s five-year Spectrum development project are finally finding their way into the hands of users and will soon begin running production applications.

Three of the 13 orders that form HP's first batch of HP 9000 Model 840 shipments are earmarked for domestic sites: the California Institute of Technology, Automated Technology Associates, Inc. and American Simflex, Inc. Another five orders are headed to buyers that were not identified. Also included among the machine's charter recipients are two Japanese organizations, two Canadian communications companies and the Singapore Stock Exchange.

Deliveries of the high-end 9000 extension are beginning almost exactly on schedule. When it was announced last February, the 840 was set to start reaching customer destinations in early December. Utilizing a reduced instruction set and other elements of the company's Precision Architecture, the Model 840 officially became available for customer delivery on Nov. 20.

Originally, HP had also hoped to be now readying the first user shipments of its 3000 Model 930, a business-oriented processor identical in architecture to the 840 that was introduced on the same day. But unforeseen technical hitches recently forced the firm to delay the start of its 930 deliveries until mid-1987.

A few prospective customers of the 840, including a software developer named Logisticon, Inc., have already tested it briefly on HP property.

Headquartered in adjacent Santa Clara, Calif., Logisticon is the first user to port its applications from an existing HP 9000 system to a Model 840, according to the company's marketing vice-president, Mike Kalashian.

The software transfer took place at the Migration Center, where Logisticon also conducted recent benchmark tests that support HP's initial performance claims for the product, according to Kalashian.

To date, the only HP hardware that supports Logisticon's line of warehouse and distribution center control applications is the 9000 Models 320 and 560. Although the software company already uses two 320s and three 560s for development purposes, it has yet to install its first 840.

However, when its customers begin upgrading from their existing equipment to HP's latest 9000 series system, Logisticon will have to follow suit and acquire an 840. An order for the processor will probably be placed by the first of next year, according to Logisticon's Vice-President of Systems Development David Scott.

When the time to move its applications over to the 840 finally arrives, the software developer expects to be able to do the job fairly easily. Logisticon's optimism stems from its earlier experiences at the Migration Center, where the firm ported an existing C language program to HP's largest technical system in three days.

"We recompiled one of our base applications under the 840's HP-UX operating system but, at first, the program didn't run," Scott said. "The reason was that our applications, which contain about 400,000 lines of code, are extremely large and blew up HP's C language compiler."

But with some necessary adjustments, Logisticon was soon able to restore the broken compiler, finish the recompilation successfully and begin running the unmodified source code on the 840. "All things considered, the porting process went a heck of a lot easier than we thought it would," Scott remarked.

After the transfer of source code was complete, Logisticon ran identical applications on both a 24M-byte 840 and a comparably configured 560. The company then compared the two resulting sets of benchmark figures and found the 840's throughput to be roughly four times greater than the 560's, Kalashian said.

The tests also demonstrated the 840's ability to support up to 60 concurrent users, compared with 20 or 30 users for the 560, he added.

For Logisticon, the new system's substantial edge in performance and support capacity promises to soon expand the firm's market horizons by "allowing us to sell to big customers that we could never previously reach," Kalashian said.

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East to boost Unix alternative

By Takehisa Kondoh

BEIJING — China's Municipal Institute of Technology of Beijing has joined with Japanese-based Nissin Software Co. to develop a family of applications software to work with the West German Eumel operating system. The Chinese-Japanese team is aiming to popularize Eumel as an alternative to AT&T's Unix.

Developed by GMD, West Germany's mathematics and computer science institute, Eumel is a multitasking, multiuser operating system that runs on 8-, 16- and 32-bit microprocessors.

Under the arrangement, Eumel is scheduled to be ported to the Great Wall, a Chinese personal computer based on Intel Corp.'s 8086 16-bit microprocessor, to write programs for word processing and scientific calculations.

The eventual software products will reportedly be distributed in Chinese markets with the Eumel operating system. Sources also revealed that some of the software will be shipped to Japanese and U.S. users through Nissin.

Nissin, a leading Japanese software developer based in Tokyo, is negotiating a similar deal with an unspecified engineering college in southern China.

Kondoh is Asian bureau chief for the CW Communications International News Service.

CORRECTIONS

In the fiscal year ended Sept. 30, Boole & Babbage, Inc. reported revenue of $34.5 million and profits of $1.3 million, or 40 cents per share. In the prior fiscal year, the company reported sales of $28.5 million and a loss of $6 million, or $1.99 per share.

Travtech, Inc.'s Traps software system [CW, Oct. 27, page 88] utilizes an IBM Personal Computer for keystroke capture, editing functions and storage of test cases.

The source for the Microcomputer file management chart [CW, Oct. 27] was IMS America Ltd., based in Ambler, Pa.

VAX boom spurs hiring war

From page 1

one year ago, she says. A VAX systems programmer with three years experience will find jobs in the $30,000 to $38,000 range on the East Coast, with salaries just $5,000 less in the Midwest.

But in New York, programmers with only two years of experience can expect to draw salaries from the high $30,000s to the mid $40,000s and beyond, according to Jack Schwartz, managing director for the New York office of Source EDP Personnel Services, Inc. "The VAX has become very popular in financial services, and New York is the hub of banking, brokerages and other financial services," he explains. Because the financial community requires so many VAX personnel, the salaries for VAX programmers in all other industries in New York have risen as well.

Bankers Trust wants systems programmers with five years of experience, a background in networking and security, good internal knowledge of the VAX system and problem solving abilities, Rose says. When it cannot find a qualified recruit, it fills in with consultants.

Consulting firms respond

The consulting business is responding to the increased need for VAX programmers. Two years ago, Trident Computer Services, Inc. in Marlboro, Mass., placed VAX contractors but made no serious effort to seek them out, says sales consultant Scott Moody. Now, with the VAX business booming, Trident is building a data base of VAX/VMS programmers and companies that need their services. "Manufacturing is one of the key areas that we see for VAX programmers right now. That seems to be where IBM and DEC are in the most competition now," he observes.

TM Floyd & Co., a Columbia, S.C., consulting firm, is predominantly interested in placing IBM professionals but can no longer ignore the burgeoning need for VAX staff. "If I had VAX programmers on my list, I could definitely place them. I have put ads in the local papers looking for good VAX programmers, and I can't find them," says Terry Floyd, president of the company.

The need for VAX professionals surprised Floyd, who recently moved to the South Carolina office from Chicago. In Chicago, he says, there are so many big IBM mainframe shops that he could cater only to them. In South Carolina, because DEC is so popular with manufacturing companies, he has targeted development of the VAX market as an important goal for his company.

Companies try job fairs and open houses to help locate the needed programmers, O'Flaherty says. In his 20 years in the recruitment business, O'Flaherty says he has seen this kind of demand only once before — when IBM CICS programmers could name their price.

Companies should take better advantage of the young programmers coming out of college, O'Flaherty says. But the pace of business has become so hectic that few companies want to take the time to train young workers anymore. "There are only so many bodies out there," he cautions.

MCI, Lotus to co-announce editable E-mail

By Elisabeth Horwitt

CAMBRIDGE, Mass. — MCI Communications Corp. and Lotus Development Corp. are expected to jointly announce on Wednesday a product that will allow users to create and send editable documents and executable code over the MCI Mail electronic mail service.

An MCI spokesman, while not directly confirming information obtained by *Computerworld*, admitted the information was "not inaccurate." Lotus and MCI have scheduled a press conference for Wednesday.

"This is the first time a public electronic mail service will be able to handle anything beyond plain ASCII text," said Merv Adrian, a communications project manager with Shearson Lehman Bros, Inc..

The IBM Personal Computer software package, reportedly called Lotus Express, enables users to create files or applications and distribute them to one or more MCI Mail subscribers over MCI's network. "The important thing is the fact that MCI is a major carrier offering a range of delivery services that can be accessed by anyone with a PC and a modem," Adrian said.

Lotus Express can be used to generate files and deliver them in a variety of modes, from hard-copy text at the low end to executable binary files at the high end, he added.

Bulletin board services such as Reader's Digest Association, Inc.'s The Source and those offered by Compuserve, Inc. allow customers to make binary files available to others by placing the files in a central data base but do not allow direct delivery of binary files to multiple recipients, Adrian said. Sending mail via MCI is also much cheaper because only the sender pays for connect time, he added.

A Western Union Corp. spokesman said the company is currently working on an enhancement to its Easylink service that would permit direct transfer of executable binary code. At the current time, however, the electronic mail service only handles raw ASCII text, he added.

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So whether you want to learn ICCF for the first time or master the facilities you're not already using, this is the book for you. (Its dozens of examples make it an easy-to-use reference, too.)

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Intel backs off 80386 claims but denies chip recast needed

Deskpro 386 developers get 16-point glitch list

By David Bright

Despite inaccuracies in its original claims for the 80386 microprocessor as well as documented anomalies concerning the chip's performance, Intel Corp. last week disputed persistent reports that the much-publicized chip will have to be remasked.

When Intel introduced the 32-bit 80386 late last year, it said the chip could concurrently run any combination of operating systems designed for it. Now Intel says that is not quite true.

Both Intel and Compaq Computer Corp., which is shipping an 80386-based system, have published lists of the chip's anomalies, but both companies say that the anomalies can be sidestepped.

Some software developers reportedly claimed that problems exist with the multitasking capabilities of the chip's protected and virtual 86 modes. Other vendors complained that the 80386 chip does not support the simultaneous operation of more than one 80286 or 80386 operating system.

For machines to achieve the latter capability, Intel should make a new version of the chip that would replace the flawed 80386 chips already installed in many systems, maintained Joe Diodati, vice-president of marketing and sales at Softguard Systems, Inc., a Santa Clara, Calif.-based developer of a virtual machine environment for the 80386.

Multitasking limitations

Siva Kumar, product manager of high-performance microprocessor marketing at Intel, reaffirmed that the chip is capable of running multiple applications in protected and virtual 86 modes but acknowledged that more than one 80286 or 80386 operating system cannot run on the chip at the same time.

This is because Microsoft Corp. was not writing 80286 software when Intel was developing the chip, and inclusion of the feature would have consumed much more silicon space, Kumar said.

However, when the 80386 was introduced late last year, Intel touted the chip's unique ability to run multiple operating systems simultaneously. According to background information distributed by Intel, "The 80386 can run concurrent applications with any combination of the PC-DOS, MS-DOS, Unix or Xenix operating systems, for example, as well as any proprietary operating system created for the chip or modified for use with it."

The 80386 will definitely not have to be recast, Kumar insisted, but Intel's next-generation microprocessor (generally referred to as the 80486) may include the multiple-operating-system feature.

It is common for chips to have some minor imperfections. Kumar added that Intel supplies purchasers of the chip with a list of fewer than 20 anomalies that could cause "little glitches" in the chip's operation if developers were not aware of them. Compaq provides software developers with a 16-item list of 80386 anomalies in the technical reference guide to its Deskpro 386 system.

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> ***Intel supplies purchasers with a list of anomalies that could cause 'little glitches' in the chip's operation if developers were not aware of them.***

Most of the anomalies are related to 80386-specific functions such as paging, according to Mike Perez, Deskpro 386 engineering development manager.

'Fairly subtle problems'

Perez said the chip contains other "fairly subtle problems" that Compaq does not publish because the company has already solved them in the machine's proprietary design. He stressed that developers can work around the anomalies as long as they are aware of them. Perez agreed that there is no need for the chip to be revised.

Meanwhile, several developers of 80386 environments and operating systems said they are pleased with the chip. At Santa Monica, Calif.-based Locus Computing Corp., developer of the Merge 386 software environment, sales director Mike Smith said the 80386 is the "cleanest" of all Intel chips. A preproduction version of the chip had some memory addressing problems, but they were fixed several months ago, according to Smith.

"We've had no trouble with the chip," agreed Gary Robertson, director of sales and marketing at The Software Link, Inc. in Atlanta. The Software Link's PC-MOS/386 operating system was designed to use both the protected and virtual 86 modes of the 80386.

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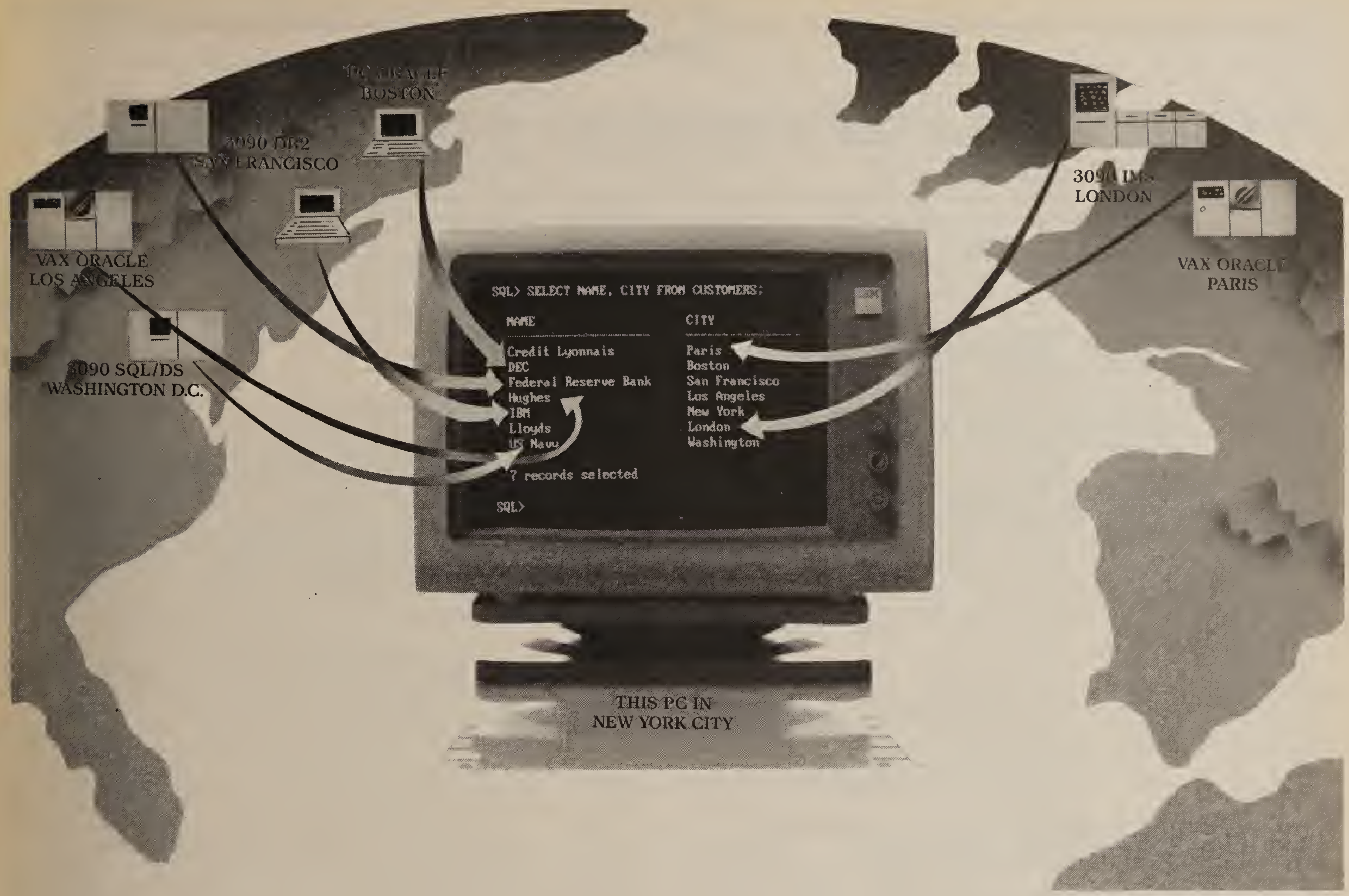

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SQL> SELECT NAME, CITY FROM CUSTOMERS;

  NAME                      CITY
  ---------------------     ------------
  Credit Lyonnais           Paris
  DEC                       Boston
  Federal Reserve Bank      San Francisco
  Hughes                    Los Angeles
  IBM                       New York
  Lloyds                    London
  US Navy                   Washington

  7 records selected

SQL>
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Printers move to work groups

From page 1

ago with an affordable laser printer, raising interest in a technology previously concentrated in high-budget, high-performance data centers. With the market flooded by a wide variety of nonimpact printers based on a handful of Japanese-made laser engines, prices at the low end have plunged and will continue to fall as companies from South Korea and Taiwan join the competition with clones, according to observers.

They say the time is right for established vendors to look away from the bitter low-end competition and toward the middle range, where they feel electronic publishing and data processing users want more features and lower prices than are offered by existing mid-range printers.

Expecting growth

"It's an area everyone expects to grow, even though it has been quiet historically. People didn't seem to want to get rid of their old, reliable line printers. Until now, the functionality in the mid-range has been basically line printer emulation mode. Now, more and more companies are fitting engines with their own interfaces and features," says Naomi Luft, research analyst for Datek Information Services, Inc., a Newtonville, Mass., market research and consulting firm specializing in printers.

Datek has estimated that page printer shipments will more than treble from 136,500 in 1985 to 653,850 in 1990. The greatest percentage growth, according to Datek, will be in the more than 20 page/min. categories, in which fewer than 5,000 of the more expensive printers were shipped in 1985 and more than 35,000 are expected to ship in 1990.

Nonimpact printer vendors have no choice, adds Catherine Dingman, senior consultant with CAP International, Inc., a Marshfield, Mass., firm that also specializes in printer market research and consulting. "They have to add whatever functionality they can at the low end and then try to drive up into the mid-range. They have to add features to the workstation products, and the next logical step is to increase their speed," Dingman says.

Defining the middle range

Analysts differ somewhat in their definitions of the mid-range printer market, particularly in terms of which printer speeds should be included. However, they tend to agree that the 6 to 8 page/min. printers do not have the performance to support work groups running electronic publishing applications or most minicomputers.

Analysts also generally agree that the mid-range products fall below printers such as Eastman Kodak Co.'s 92 page/min. 1392, IBM's 210 page/min. 3800 and Xerox Corp.'s 120 page/min. 9700 system.

That basically leaves the middle range to cover printers with speeds of 12 to 70 page/min. Major vendors like IBM and Xerox and the companies that sell compatible products have offered laser printers in the mid-range and high-performance markets for almost a decade.

But analysts expect a shake-up in the mid-range market, with manufacturers customizing basic engines — made by OEM vendors such as Canon, Ricoh Corp. and Kentec Information Systems, Inc. — with controllers and paper handlers designed for specific applications.

"What you have in the mid-range today is kind of a take-it-or-leave-it situation," says Ajit Kapoor, director of electronic publishing services for Dataquest, Inc., a San Jose, Calif.-based market research firm. "In a general sense, that is the next area of growth for nonimpact printers," Kapoor adds, noting that some of the hottest products will be 35 to 40 page/min. laser printers designed to support demand printing with user-selectable fonts and papers.

Kapoor says that the 300 dot/in. resolution of printers announced at the recent Comdex/Fall '86 will probably be adequate for most users and that the basic technology of putting images on paper is unlikely to change drastically during the next few years.

He and other analysts note that laser, LED and ion-deposition technologies all have their places in the market, with laser still dominating the entire page printer market.

James Minervino, manager of printer market programs for International Data Corp., a Framingham, Mass., market research firm, estimates that 90% of the mid-range page printers and 99% of all page printers are laser based.

Officials at Xerox, which observers say offers one of the broadest lines of nonimpact printers, expect to use all of the technologies, although most of their page printers are laser based.

Unlike some analysts, who see lasers and other nonimpact printers supplementing impact line printers, Xerox manager of decentralized laser printer marketing George Tunick sees laser printers gradually replacing line printers.

"What we have is work that has been done on line printers for years and people are finally moving over to laser printers," says Tunick, who notes that DP managers want risk-free products. He claims laser printers have become reliable enough that DP managers can count on them in many of the applications previously served by line printers.

However, Tunick adds that line printers will continue to have a place in the market because of their price-performance figures.

According to Kapoor, the technical breakthroughs will occur outside of the main print engine, as vendors find better ways to use versatile paper handlers, powerful graphics processors and page description languages. Kapoor says that a breakthrough in standardization of page description languages could occur next year if IBM decides which of several languages it will use in its next generation of laser printers.

Minervino adds that reduced pricing owing to increased competition and volume will be one factor in the growth of the mid-range nonimpact printer market. But most of the sales will be application-driven, he says. He observes that users are looking for a high degree of flexibility, which means not only being able to use different types of paper for different parts of a print job but also being able to print from all of their software programs without using complicated escape and print commands.

Price wars

At least one OEM vendor on the fringe of the middle range, Kentek, plans to concentrate on that range rather than the low end. But even in the mid-range, Kentek could face price wars, according to company marketing director Robert Parks. Parks says the entry of several Korean companies into the low-end laser engine market reinforces Kentek's commitment to the mid-range.

But he adds that a price war could hit the middle market as well. Parks, whose company builds the Kentek K-2 12 page/min. LED printer, claims it is less expensive for a group of users to share a higher speed page printer than to have their own dedicated entry-level printers.

Parks, whose company reportedly supplies IBM with the engine for the IBM 3812 printer, says that the trend in the mid-range will be one of evolution, rather than revolution, as vendors refine their products. He expects that mid-range printers will eventually include more and more features now found on mainframe-scale printers — features such as advanced communications capabilities and disk drives for storing fonts and formats.

AI shell rolled out by Unisys

By Charles Babcock

BLUE BELL, Pa. — Unisys Corp., the merged Burroughs Corp. and Sperry Corp., last week announced an expert system development shell for IBM Personal Computers and compatibles, including Unisys personal computers.

The Knowledge Engineering System II (KES II) is also available on Unisys's Unix-based (Sperry) 5000 minicomputer line. It will be out on the Sperry 1100 series of mainframes in early 1987.

The shell allows a programmer or other skilled user to develop a knowledge base without being schooled in expert systems building, a Unisys spokesman claimed.

"You have to have a good understanding of computers and logical thought. You don't have to be a knowledge engineer," he said.

The shell, written in the C language, is priced at $500 on personal computers and $1,000 to $20,000 on the Series 5000 minicomputers. Pricing for the mainframe version was not available.

KES II includes three reasoning method modules that make up its inference engine: a hypothesize-and-test approach to problem solving, an IF-THEN production rule to specified condition approach and a probability test of historical data to predict likely consequences, the spokesman said.

Only the IF-THEN inference module is available with the initial release of the product. The hypothesize-and-test module will be available in December, and all three modules will be available on personal computers, Series 5000 minicomputers and 1100 series mainframes early next year.

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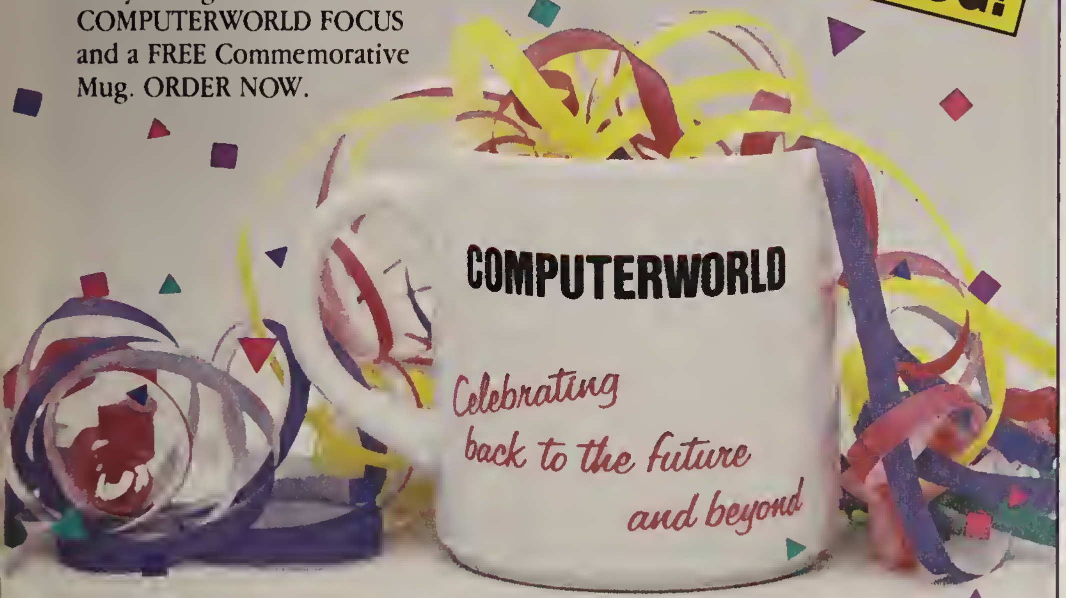

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DPMA concludes state computer crime laws outdated

Rules fail to address information crimes

By Mitch Betts

Some state laws on computer crime are weak and outdated and fail to address the important issue of information crime, officials of the Data Processing Management Association (DPMA) concluded after a five-year study.

However, because state laws are frequently amended, DPMA officials shied away from naming the states with faulty laws for fear their list would be incorrect. "That's what we're going to do now — research to identify those states," said Joseph E. Collins, manager of governmental affairs at the DPMA, based in Park Ridge, Ill.

Once that research is completed, perhaps in the first half of 1987, the DPMA plans a lobbying campaign for amendments to strengthen weak laws in targeted states, according to Collins.

"While most states have covered computer crime in one form or another, several states have outdated laws that need to be revised," concluded Richard Cashion, chairman of the DPMA's committee on computer crime. Cashion is assistant director for data processing at Tennessee Technological University in Cookeville, Tenn.

"A lot of the laws that are out there are just basic theft, fraud and trespass laws where the state legislature added the word 'computer.' They're really not addressing information crime or computer crime as such. They're just makeshift changes," Cashion told *Computerworld.*

For example, he said, some state laws exclude home computers from the definition of computer, and some fail to cover theft of information.

"If information is not recognized as something of value that can be stolen, removed or misappropriated, then you can't prosecute someone for stealing something that has no value," Cashion emphasized.

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> ***The DPMA said victims should be entitled to civil relief and damages, and authorities should be allowed to seize the property used to commit the crime.***

The DPMA recently issued a list of principles and provisions that it said should be included in any computer crime legislation, although it said the term "computer crime" is misleading.

"The real emphasis should be placed on information . . . the key resource of our society," the DPMA statement said.

"Currently, most laws place the emphasis on the computer. The computer is merely the weapon. Information is the abused, stolen or destroyed resource," the statement continued.

In addition to the typical criminal offenses of unauthorized access, alteration and destruction of computer data and computer-assisted felonies, DPMA's guidelines listed several unusual offenses, such as the unauthorized release of computerized information, unauthorized software copying and aiding or soliciting computer crime.

In addition, the DPMA said that victims should be entitled to civil relief and damages, and authorities should be allowed to seize the property used to commit the crime.

Furthermore, "it is the duty of everyone who knows of a computer crime to report it," the DPMA statement said.

DPMA officials generally praised the new federal computer crime law, called the Computer Fraud and Abuse Act of 1986 [CW, Oct. 13].

"The new law covers private computer systems involved in interstate crime," said David R. Smith, DPMA president. "Previous legislation did not cover the private sector. Additionally, state laws are not clear concerning the jurisdiction matters of interstate crimes," he said.

However, Cashion pointed to one flaw in the federal statute, which he said seems to inadvertently exclude crimes committed by a person using a dumb terminal to access a host computer in another state.

President Reagan signed the computer fraud bill into law Oct. 16, and he signed the complementary Electronic Communications Privacy Act into law Oct. 21.

Criminal acts

DPMA recommends these acts should be made illegal

- Unauthorized use or access of computer resources, including the computer and the information stored in it.
- Unauthorized release of computerized information.
- Unauthorized copying or use of software by someone other than the owner.
- Unauthorized modification or destruction of computer resources, including the computer, software and information. (Destruction can be contamination or any act that makes the resource unsuitable for its intended purpose.)
- Unauthorized and malicious denial of access to computer resources, including the computer, software or information.
- Use of computer resources in the commission of a felony.
- Aiding, abetting or conspiring to commit and/or solicit computer crime.

Information provided by Data Processing Management Association statement, "Principles for Computer Crime Legislation," Nov. 12, 1986.

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Mainframe software vendors hope IBM 9370 spurs market

But critics complain packages offer little

By Charles Babcock

Mainframe software vendors see the market for their products growing with the introduction of IBM's low-end 370-family machine, the 9370. But some observers say mainframe packages offer little for the departmental and scientific engineering role that the 9370 is likely to play.

"We were all smiles" after IBM's Oct. 7 announcement of the 9370, said John Imlay, chairman of Atlanta-based Management Science America, Inc. (MSA). The mainframe applications vendor expects to do a brisk business in its standard accounting, human resources and manufacturing packages for the machine.

However, others are not so sure. Many mainframe applications and data base management systems appear to be too complex to be used at the departmental level, where the 9370 is expected to be placed.

In the past two weeks, spokesmen for Software AG of North America, Inc., Cincom Systems, Inc., Pansophic Systems, Inc., Applied Data Research, Inc. (ADR) and Cullinet Software, Inc. said their mainframe packages will require a minimal conversion effort for the 9370.

"Our applications will run as they are on the 9370. It will enlarge the marketplace," a spokesman for Cullinet said.

Some observers, though, are not certain it will be as easy to sell products for the 9370 as the mainframe suppliers anticipate. These observers point out that few mainframe suppliers are developing software that takes advantage of the special communications and scientific processing features of the 9370 or its anticipated role as a departmental processor.

The rewrite task may be larger than projected, according to Marty Gruhn, vice-president of The Sierra Group of Tempe, Ariz.

"My experience after 20 years is that nothing is as simple as it looks," she said.

She questioned whether a 9370 running existing IBM office automation software like Distributed Office Support Systems and Professional Office Systems applications could compete effectively against a Digital Equipment Corp. VAX running All-In-1 or a Data General Corp. minicomputer running CEO.

"The 9370 is going to be a very successful machine," said E. F. Hutton analyst Michael Geran, "but we're going to have to extend the software in office automation and connectivity."

Peer-to-peer communications

Geran also predicted that despite the 9370's ability to fit into the Systems Network Architecture world of larger mainframes, it will be two years before software is available to allow it to conduct peer-to-peer communications.

Burton Grad of Burton Grad Associates, Inc. in Elmsford, N.Y., said about 90% of 370-family applications can be moved easily to the 9370. Those that had systems code inserted into them will be more difficult to migrate, he noted.

He pointed out that IBM does not support IMS and DL/1 on the 9370, meaning data base management system cutomers who have purchased systems that run in that environment will have to make changes to them before they will run on the 9370.

Organizations that want to implement distributed data bases now have a processor to consider at the departmental level, but "significant utility programs are still needed to do that," Grad said.

Grad also claimed IBM will have trouble providing all the support needed for a 370-family processor from remote sites, as is planned.

9370-specialized software

One of the few companies targeting specialized software for the 9370 is ADR, which announced to its users group in September that it had been anticipating the machine for a year. It is developing local-area network (LAN) products that will interface to the 370 mainframe world. ADR wants its upcoming fourth-generation language for LANs to be able to access data base management systems on the 9370. "We have development work to do," said Joseph Farrelly, vice-president of research and development at ADR.

Pansophic Chief Executive Officer David J. Eskra said his firm is working on a 9370 version of its library management system, Panvalet.

Dennis Vohs, executive vice-president of MSA, said the 9370 is more likely to be accepted as a departmental processor than its competitors because it does not disrupt the MIS department's world.

"MIS won't fight seeing them littered across the landscape the way they fought System/36s and System/38s," Gruhn agreed. But she questioned whether the 9370 will automatically blunt DEC's drive into departments with the VAX. "A lot of MIS directors are going to question whether they want to extend a 15-year-old architecture" instead of selecting processors and software that are easier to use at the departmental level, she said.

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Long-awaited McDonald's ISDN trial to start in two weeks

Four rival vendors part of linkage test

By Elisabeth Horwitt

During the second user-site Integrated Services Digital Network (ISDN) trial, scheduled to begin Dec. 16, at least four rival communications equipment vendors will test whether their terminal interfaces conform closely enough to the telecommunications standard to communicate.

McDonald's Corp. agreed more than two years ago to participate in the trial, which is sponsored by Ameritech divested Bell operating company Illinois Bell, because the fast-food giant wanted the emerging technology for its own use, said Patrick Krause, director of telecommunications.

"We hope that ISDN will help us consolidate control of our many different local- and wide-area networks to simplify network administration and help us respond to users' needs," Krause noted. "ISDN is one of the first steps to application compatibility among multivendor systems."

Slated to continue at least through early 1988, the trial ISDN network will link a wide variety of workstations and hosts at McDonald's headquarters, located in Oak Brook, Ill., through a Northern Telecom, Inc. DMS-100 ISDN switch residing at Illinois Bell's central office. The McDonald's installation currently includes a wide variety of terminals and microcomputers, plus Wang Laboratories, Inc. VSs, AT&T 3Bs, an IBM 3084 and a Tandem Computers, Inc. fault-tolerant computer.

The company will start with 50 basic-rate digital subscriber lines and gradually ramp up to a projected 300 to 400 lines by the end of 1987, according to Krause. The basic interface defines two 64K bit/sec. B channels and a separate 16K bit/sec. D channel to carry data packets and signaling information.

McDonald's Krause

McDonald's is using the trial to experiment with a number of communications applications, Krause noted. The company will use ISDN links to replace existing IBM 3270 coaxial terminal-to-host connections.

The Tandem host, which is currently equipped with an X.25 interface, will be used to link the company's workstations over a private packet-switched network that can run over either an ISDN B or D channel. McDonald's customer-premise equipment will also interface, via the ISDN switch, with Illinois Bell's packet-switched service. The company also may hook up video terminals to the ISDN network, Krause added.

Voice mail experiment

The latter part of the trial will involve the primary ISDN interface that defines a high-capacity bandwidth of 23 B channels plus one D channel. "We want to try out the primary rate to multiplex terminals to a host," Krause explained. McDonald's is also experimenting with a voice mail system that it plans to interface with the AT&T ISDN switch over a primary interface, Krause said.

Two emerging ISDN capabilities that McDonald's hopes to test during the trial are subdivision of a 64K bit/sec. B channel into subchannels and aggregation of multiple B channels into one high-speed link, Krause said. The latter application would provide the necessary capacity to support compressed digital video transmissions, he added.

The Illinois Bell trial will involve five to 10 equipment vendors, the divested Bell operating company said. Four of these have officially announced their participation. AT&T Network Systems will provide terminal adapters that enable a wide variety of existing terminal equipment to communicate over basic ISDN connections, said account executive Maura Scanlan.

AT&T Network Systems will also supply an integrated voice/data workstation with built-in ISDN interface, according to Scanlan. Both products are currently in the prototype stage, but the company plans to officially release both as commercial offerings sometime during the first quarter of 1987, she added.

All the products used in the trial are designed to communicate with AT&T's 5ESS switch. While the basic ISDN interface is sufficiently well defined to permit different vendors' implementations to communicate, different vendors' central office switch products still retain software incompatibilities, according to David Gould, vice-president of corporate communications at Fujitsu America, Inc.

"The way terminal adapters communicate via ISDN is still defined by the central office switch," Gould said. "We can modify our terminals to communicate with either AT&T's or Northern Telecom's ISDN switch, but you can't just unplug a terminal and move it from one switch to the other."

ISDN interfaces

Fujitsu will supply terminal- and host-based ISDN interfaces, integrated voice/data terminals and image phones for the trial, Gould said.

Hayes Microcomputer Products, Inc. will also supply ISDN interfaces. ISDN project manager Jay Duncanson would not reveal the exact type of products to be used in the trial. "They are not commercial yet," Duncanson said, but he admitted that Hayes "wants to have the same market share interfacing equipment to the new, improved telecommunications network as it now has sending computer equipment over existing analog telephone lines."

NEC America, Inc. will supply three of its existing products for the trial. The ISTA 1000 is an integrated voice/data workstation that can perform as an IBM PC, ASCII terminal or telephone. The ISTA 200 is an intelligent telephone set. The third product is an adapter that interfaces existing terminal equipment with an ISDN basic rate channel.

Originally slated to be the first ISDN trial to begin operations, the project was delayed for approximately a month while AT&T finished implementing software on the 5ESS ISDN switch at Illinois Bell's central office. As a result, divested Bell operating company Mountain Bell initiated the first ISDN trial on Nov. 18, using a Northern Telecom, Inc. DMS-100 switch [CW, Nov. 24].

While the hardware used in AT&T's ISDN switch is "commercial, the software is coming slowly," said Jim Bendel, district manager of ISDN operations planning at Illinois Bell.

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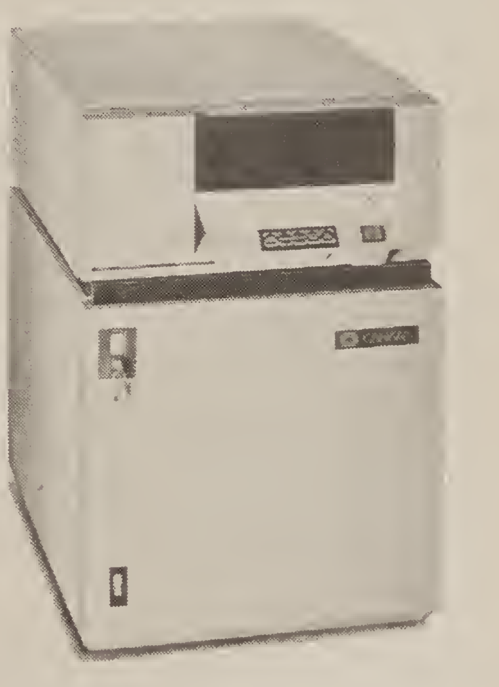

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VIEWPOINT

EDITORIAL

A marriage of minds

We cannot help but note, as this 40th anniversary year of Eniac ends, the continuing debate focusing on this country's alleged loss of a leadership position in both computer research and manufacturing. At last month's Fall Joint Computer Conference, the 1,200 computer scientists and engineers attending heard speaker after speaker warn that both business and government policies are inhibiting, rather than promoting, the advance of U.S. technology and thus of the nation's economic competitiveness.

At least one such speaker, Gordon Bell — the former Digital Equipment Corp. superstar, now assistant director of the National Science Foundation's Information Science Group — harked back to Eniac in his remarks. The world's first large-scale, fully functional, digital computer had for its impetus a user willing to take risks to achieve significant benefits: the Department of Defense with its requirement to dramatically improve ballistics calculations in a yet-unstudied African terrain. Such a clearly focused and goal-directed project, noted Bell and others, is needed if the U.S. is to move into the next generation of computing.

That is the tack taken by the Japanese in their oft-discussed fifth-generation project, one which will mobilize the nation's resources to the tune of $850 million during the next decade.

Many have lamented the fact that the U.S., with its highly independent and individualistic research and industrial communities, has failed to generate an overall national purpose and effort comparable to that of the Japanese. They call for national policies and programs and a partnership between government and technologists.

A better marriage, to our way of thinking, is one that has attracted less attention — the one between academia and industry. One of the prime examples of such a match occurred without much fanfare last week when more than 400 university researchers met for the 11th annual IBM-sponsored study conference.

They talked of joint industry-university projects large and small: a 3090 now available on the Cornell University campus to provide supercomputing capability for the nation's research community and the "Andrew" system at Carnegie-Mellon University, a model network that allows students and faculty to access data bases, instruction modules and the like from any workstation on campus.

There is a real and unforced synergy between these two communities. Industry depends on universities both for basic research and for future employees. Universities have the opportunity to do unfettered research; they need state-of-the-art equipment and research funds to attract top-notch faculty and students.

This is the U.S. research community at its best, and it offers far greater opportunity for the kind of innovation that will assure the U.S. of technological leadership than does any congressional edict or committee. Cited during the study group's final session was Alfred Sloan, the former head of General Motors Corp., who said, "If [corporations and universities] can go forward together in understanding and cooperation, there is perhaps no problem beyond their joint power for resolution." We concur.

LETTERS TO THE EDITOR

The VTAM micro-mainframe link

In various articles printed in *Computerworld* during the past few months there have been references to VTAM-based micro-mainframe link products. The latest of these, "VTAM links micro, hosts" [CW, Oct.13], failed to include any mention of the only production product available in that category.

The article mentions a product from Tangram Systems, which is being beta-tested at various sites, and one under development from Linkware Corp. Phaser Systems, Inc. has had its VDAM product available for more than three years with more than 2,000 units in use by some of the largest corporations in the world.

We also have Micro/SPF, with more than 20,000 copies shipped over the last four years. This, combined with Micro Focus V Cobol products and VDAM, provide an MVS Cobol development environment without using IBM's TSO.

Other vertical workstation products will be announced soon, covering a wide range of applications with various personal computer-based software vendors.

John Mullen
President
Phaser Systems, Inc.

Inexpensive modems and security

While I enjoyed J. J. Buck BloomBecker's report on computer crime and punishment, "New federal law bolsters computer security efforts" [CW, Oct. 27], I feel I must point out a minor piece of naivete on his part. He stated a modem could be purchased for "less than $500," implying that this was a low price. A more accurate figure would be "less than $50." Indeed, associates of mine have been using a full-featured 300 bit/sec. modem that cost a mere $23 for six months. A new 80-column 300 bit/sec. dial-up terminal emulation system and microcomputer can be purchased for less than $150. Apparently, the democratization of telecommunications is much further along than might be implied by the article.

Additionally, I believe a great deal can be done to improve system security without resorting to expensive, CPU-intensive security monitors. Simply impressing users with the need for unique, nonobvious passwords would do a great deal. Most uneducated users will use a password such as their first name or the word "password." Executives from a major telecommunications service, which shall remain nameless, tell me that that is the most common password on their system and their biggest security problem.

In short, as long as the front-line defenses of a system are sound, you are safe from all but the most dedicated attacker, and most systems analysts should be capable of detecting repeated invalid system access attempts.

R'ykandar Korra'ti
Transylvania University
Lexington, Ky.

Keeping the human element alive

Regarding Ron Schneiderman's column, "Employee productivity: Big Brother is monitoring you" [CW, Nov. 10], I am sure that he is looking forward to using a word processor that will monitor his words generated per minute. Perhaps he envisions software that will offer incentives for his quotient of dubious analogies per column inch.

As a data processing professional, the last gift I would hope to offer our civilization is the rendering of the 21st-century office in the form of a 19th-century sweatshop. Schneiderman's support for VDT monitoring casts an ironic light on the Charlie Chaplin character in the IBM ads who has apparently not come as far from the world of Chaplin's film, "Modern Times," as we would like to think.

There is a battle being waged over whether the future will be characterized by the "high-tech/high-touch" society noted by John Naisbitt in his book *Megatrends* or by the harrowing warning that the danger of the computer age is not that machines will think like people but people will think like machines. I applaud the efforts of 9 to 5 to keep the human element alive in the office.

Daniel A. Coleman
The Village Companies
Chapel Hill, N.C.

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VIEWPOINT

Trying harder: The neck-and-neck sweepstakes to be No. 2

No, Virginia, Unisys is not a new disease — or a new kind of penicillin. I can't imagine why a company that owned two venerable computer names like Burroughs Corp. and Sperry Corp. would choose a new appellation that has no meaning for anyone.

The new firm feels certain its combined revenue will securely position it as the No. 2 company in the computer industry, and this elevated position will secure old customers and bring new ones into the fold. But does computer arithmetic really work that way?

What does it mean to be No. 2 if No. 1 is seven times your size? Do customers look at your rank position or the distance that separates you from the lead position? Being No. 2 really is a compelling marketing position when it implies a real photo finish — two companies fighting it out, neck and neck for the winning position.

Long-term primacy

That is clearly not the case here. Not even the most aggressive computer entrepreneur would seriously contemplate knocking even this year's beleaguered IBM out of its No. 1 spot. If IBM's stock price and current earnings are in doubt, its long-term primacy in the computer industry is not.

Computer industry arithmetic says company size is not necessarily additive. Totaling two revenues and saying Unisys Corp.'s combined size is greater than Digital Equipment Corp.'s may be the wrong way to look at this. Burroughs and Sperry were venerable computer industry names with large customer bases and resources and worldwide operations.

Perhaps, in the long run, they will together be more successful at seeking and keeping customers and markets than either of them could separately. But neither inspires customers or industry analysts to suggest that either corporation, or their combined sum, represents a serious challenge to IBM's primacy in any significant market. DEC does.

By AMY D. WOHL

IBM's recent announcements on the 9370 product line and the tone and content of the announcement itself make that clear. It is DEC that threatens to win a foothold among IBM's biggest and best clients and customers.

In fact, in the amount of time it takes a company the size of IBM to react to a feisty and very successful competitor, that foothold has already been won. DEC's position vs. Big Blue will likely be strengthened in the next two years.

Meanwhile, IBM will move ahead at its usual stately pace: First, to make its announced products and then to wait out the necessary time for IBM customers and software developers to build applications that capitalize on and properly exploit these new products.

It is DEC with which IBM felt driven to identify, not once but many times, in delivering its aggressive (and, some say, premature) product line announcement. Again and again, IBM pointed to DEC's too successful rhetoric, claiming it was IBM and not DEC that had the best communications offerings; IBM and not DEC that had the broadest product offerings; IBM and not DEC that had the most office automation customers (assuming one counts every 3270 terminal on a Professional Office System-bearing VM processor as an office automation user.)

Some analysts were amused. Others felt the announcement and the answers to pointed questions sounded just a little bit desperate. Of course, IBM isn't threatened in the sense that it is likely to lose its No. 1 spot. But giants have to look sharp to every invasion of the ants. Keeping a giant healthy is no small chore.

IBM's healthy paranoia about why so many of its customers now consider DEC their "other" computer vendor is not really the point here. The point is that IBM has not worried much of late about Sperry and Burroughs at all.

Of course, there are mainframe strategists and competitive product trackers who follow the BUNCH group's every move. But BUNCH is annually being reduced in relative size and power — and when IBM has a bad year it usually means that everyone has a bad year, not that a BUNCH member is making significant gains.

Treasured No. 2 position

We suspect customers will continue to think for some time that Unisys is two solid but unexciting companies joined together and not a single, solid No. 2. If that goes on long enough (and if DEC with luck and hard work continues on its roll), DEC might just manage to hold on to its treasured No. 2 position before anyone notices that, for a little while, it wasn't No. 2 at all.

Looking at the relative growth rates — and the attention paid to mid-range products rather than high-end ones — might shed some light.

After all, in a year when IBM slowed down, perhaps because the high end of the market is saturated with products and customers are scrambling to use the million instructions per second they already have, it is DEC with its strength in the mid-range, rather than IBM's venerable mainframe competitors, that is likely to have a strong potential for additional success.

Three plus four might not mean two, after all.

Wohl is president of Wohl Associates in Bala-Cynwyd, Pa., and editor of "The Wohl Report on End-User Computing" newsletter.

How the Soviet Union plays computer-industry catch-up

GUEST OPINION

By VLADIMIR BUREVICH

Any American schoolboy knows the first country to develop a computer was the U.S. But the second, and the first country in Europe, was the Soviet Union in 1950.

Academician Nikita Moiseyev, in describing his visit to Western computer centers in the late '50s, stressed that in methods and in the computers themselves the Soviet level was certainly comparable. Later on, however, progress was slowed due to mistakes in targeting the direction in which the industry should go and a shortage of funds, which had to be funneled into iron and steel, construction and transport.

Even so, in the early '80s the Soviet Union scored new successes in the computer field. The Soviet electronics industry joined the biggest producers of components, exporting 30,000 different articles to more than 30 countries.

First-class computers

When the Soviet satellite Vega reached Halley's comet, Western experts confirmed that the Soviet Union had first-class computing facilities at its disposal.

The idea of the Soviet Union's vast and unbridgeable lag behind other countries in electronics is composed of a multitude of stereotypes that, though based on individual facts, are nevertheless a far cry from the truth. While the Soviet Union did not really mass-produce personal computers until recently, the situation in, say, supercomputers is entirely different.

The Western media still speaks of a lag, however. At the end of last year, for example, *Fortune* magazine claimed the Soviets did not produce anything to touch U.S. supercomputers' speeds of 100 million instructions per second (MIPS).

The fact is that long before that, the Soviet Union developed its Elbrus-2 computer, capable of 120 to 150 MIPS. In the early '80s, the Soviet Union started regular production of PS-2000 computers with a speed of 200 MIPS, which were on par with the best U.S. computers. The differences, however, lay elsewhere.

To begin with, the Soviet supercomputer proved to be much less expensive: about a million dollars (at the official exchange rate), or one-fifth to one-eighth as much as similar machines on the world market. Secondly, the PS-2000 was based on an entirely new parallel design that attracted particular attention among such leading U.S. firms as Control Data Corp., which offered immediate cooperation. The U.S. government's electronics embargo vetoed such projects, however.

Another major step in closing the perceived electronics lag is a collective network of computing centers that will be put into operation in a year's time under the auspices of the Soviet Union's Academy of Sciences, which will integrate eight regional computing networks in the European Soviet Union, the Urals, Central Asia, Siberia and the Far East.

The concentration of resources and acceleration of the entire industry linked with computing technology is today a reality of the Soviet Union's economy. In the current five-year period of 1986-1990, the technology's output is to grow 2½ times, and capital investments, three times. Soviet personal computers have been put into regular production, both for training and home purposes, the latter of which would cost as much as a conventional TV, and its price may be halved.

Half of the personal computers to be manufactured in this five-year period will be sent to schools. As many as 70,000 mathematics and physics teachers have undergone retraining for school computer instruction. Computer clubs and entertainment centers are springing up everywhere.

For all that, Soviet specialists have not succumbed to euphoria nor lost their ability for critical assessment. "The quality of our computing equipment," notes Yevgeni Velikhov, vice-president of the Academy of Sciences, "is, so far, slightly below world standards, but existing interesting ideas offer the hope that this lag will be overcome in the current five-year period."

Mass production

With all the fundamental research and the diversity and variety of design solutions, it is mass production that has often proved to be the stumbling block. Here, machinery, management and incentives that were helpful in tackling the tasks of industrial growth in the prewar and early postwar periods need reshaping to respond to modern conditions.

This is why the radical economic reform now being carried out in the Soviet Union, which is largely affecting the sphere of technological progress, is one of the key conditions for large-scale success in the Soviet Union's electronics industry.

Coupled with new approaches in financial, investment and structural policies and with the Soviet Union's ability to concentrate funds in priority areas, this enables us to expect results that only recently seemed to be in the future.

Burevich is an analyst with the Novosti Press Agency in Moscow.

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SYSTEMS & PERIPHERALS

HARD TALK
James Connolly

High power in small packages

So many thousands of words have been spoken and written about how computer systems are getting smaller and more powerful that it is easy to lose track of why some manufacturers are jamming high-powered systems into tighter and cheaper packages.

This occurred recently, when Hewlett-Packard Co. and Data General Corp. announced office environment systems providing anywhere from 30% to 100% performance boosts over earlier machines. Like their competitors throughout the minicomputer industry, what HP and DG did essentially was to take the power of larger existing machines — including some systems that require at least moderately controlled environments — and move it into smaller boxes that can fit alongside or under a desk.

Much of the industry's attention has focused on the power that is being packed into personal computers and, in the multiuser arena, Digital Equipment Corp.'s Microvax II, which was designed to provide in an office machine almost as much power as DEC's computer room workhorse, the VAX-11/780.

But recently it has become more and more clear that DEC's minicomputer competitors are doing more than butting heads with each other and with IBM and DEC at the high end of their product lines. Those vendors recognize that they have to control entry-level and department-level processing, too. Most of those vendors are on their second generation of pedestal-style minicomputers providing the performance of

See **HIGH** page 20

Connolly is Computerworld's *senior editor, systems & peripherals.*

IBM System/36, 38 users unconcerned about 9370

By Alan Alper

SECAUCUS, N.J. — IBM System/36 and 38 users are confident that IBM will continue to support their requirements, although Big Blue is embarking on an alternative mid-range strategy with its recently introduced 9370 processor line.

At a recent convention for metropolitan New York users of the System/36 and 38 many attendees indicated that they believe IBM will continue to support the System/36 for some time, largely because of its installed base of more than 100,000 machines. The fate of the System/38, which received a mid-life kicker last summer [CW, June 23] is less certain, users said.

"The customer base for the System/36 is large. IBM would not abandon a base that is that large," noted Joseph Long, data base manager at a Bell & Howell Co. division in Allentown, Pa., voicing the beliefs bandied about at the convention center here.

"The System/36 will be around for a longer time than the System/38 just because of its larger installed base," concluded Harold Rostoker, a senior programmer and analyst with Nabisco Brands Ltd. in Parsippany, N.J.

Although the introduction of the 9370 line has extended IBM's ubiquitous 370 mainframe architecture further into the minicomputer level, System/36 and 38 users questioned said they had no immediate plans to move into the 370 world.

"Our commitment to the 36 is extensive and companywide, and at this point, we're not willing to upgrade. If the 9370 had been released three years ago it would have been a viable alternative, but now we're wedded to the 36," said systems manager Dennis Howie of Shulton, Inc., a Wayne, N.J., fragrance manufacturer.

Nabisco, which has hundreds of System/36 processors corporatewide, is also planning to continue to use the minicomputer for the immediate future. "The 9370 is too big for what we need and too expensive," Rostoker noted.

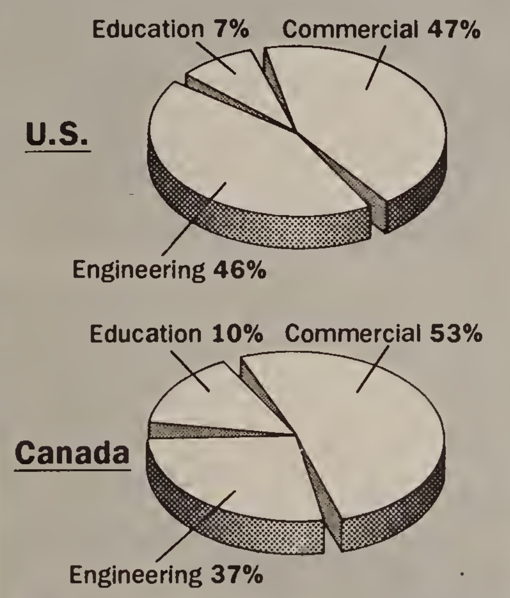
See **SYSTEM/36** page 21

DATA VIEW

JEFF BABINEAU

VAX in nations

Commercial DP dominates Digital Equipment Corp. use more in Canada



Information provided by Computer Intelligence survey of 27,500 DEC sites in October 1986.

Fujitsu revamps Pick-based line

By David Bright

SAN JOSE, Calif. — Responding to the increased demands of business computing environments, Fujitsu Microsystems of America, Inc. has revamped its line of computer systems based on the Pick Systems, Inc. operating system.

Fujitsu added a four-user system with greater disk capacity, announced a four-user version of the Pick operating system for a low-end microcomputer system and stopped marketing two of its low-end systems.

"Today's business applications require multiuser systems with greater disk memory capacity than in the past," said Wayne Wahlenmeier, vice-president and general manager for Fujitsu. "To meet these market demands, we have streamlined our Series 2000 product offerings to better serve

See **FUJITSU** page 21

INSIDE

L/F Technologies adds two Unix-based multiuser systems/**20**

NEW THIS WEEK

- Aptec offers an I/O computer system
- For more on this and other new products, see pp. 91-103.

INSTANT ANALYSIS

"Don't plow the field with one cow when you can do it with 100 chickens."

— Harold Stone, artificial intelligence researcher at IBM's Watson Research Center, on the subject of parallel processors.

Honeywell adds Unix-based system to shop-floor line

Machines to manage production, control

By James Connolly

DETROIT — Honeywell, Inc. has introduced a series of enhancements and additions to its shop-floor automation product line, including a Unix-based work cell management system.

The announcements were made at the recent 1986 Autofact show.

The Work Center Manager, which uses Charles River Data Systems, Inc.'s Universe/VME supermicrocomputers, is said to manage production and control needs at cell and supervisory levels of discrete manufacturing.

According to Honeywell, the machine helps to integrate the operations of large work cells and multiple work cells.

Supports MAP

The Work Center Manager uses the Manufacturing Automation Protocol (MAP) and supports up to 3G bytes of on-line storage, 16M bytes of memory and 64 communication ports, according to Honeywell. Prices range from less than $100,000 to $250,000, depending on the number of devices in the configuration.

Honeywell also announced completion of certification tests for conformance to MAP Version 2.1 on its Work Center Control (WCC) 1250 supermicrocomputer.

The company said the WCC 1250 complies with MAP 2.1 definitions for Common Application Software Elements, Network Management Agent, directory services, session, transport, internetwork and Logical Link Control.

Remaining certification

Honeywell said the one remaining certification is for the File Transfer, Access and Management Protocol, which the firm expects to complete in December.

The company also said it has made the initial shipment of a MAP 2.1 software package for its DPS 6 minicomputers. That package permits use of the DPS 6 in a local-area network that conforms to MAP 2.1.

In another announcement, Honeywell introduced enhancements to its WCS 300 Work Center Supervisor.

A user graphics system is now standard on the WCS 300 and gives users the ability to create custom displays for process monitoring and control.

Options announced include a recipe function, which speeds control equipment setup and record keeping, and an interface system that enables the WCS 300 to communicate with programmable controllers from Allen-Bradley Co.

High power in small packages

From page 19

what a few years ago had been — like the 11/780 — a high-end, glass-house system.

An analyst for Dataquest, Inc., a San Jose, Calif.-based market research firm, offers a theory on why those minicomputer vendors are hitting the low end so hard these days.

"All of the major vendors are trying to make entry into their proprietary environment as easy as possible, and they are doing it with an emphasis on networking. They are working with a window of only one-and-a-half or two years before super-cheap Unix platforms hit their market. The point is to lock people into the proprietary environment now and make it too expensive to switch later," Dataquest's Kimball Brown says.

Brown adds that Unix engines will get "ridiculously cheap" during the next two years with the spread of Unix as an industry standard and the use of more powerful microprocessors such as the Intel Corp. 80386 and Motorola, Inc. 68030.

> ***'The vendors want to lock people into the proprietary environment now and make it too expensive to switch later.'***
>
> — Kimball Brown
> Dataquest, Inc.

With those products around the corner, it is no surprise that the mini vendors are moving smaller and faster departmental systems out the door so quickly. Those vendors seem to recognize that only a handful of proprietary architectures and operating systems will survive. Therefore, they are positioning themselves for the onslaught from the industry-standard boxes.

It is apparent that IBM and DEC have the market strength to survive such an assault, at least for a few years, and that some of the others will hold off the attack by offering good products, good interconnectivity, good service and good prices. Some of the others, however, are likely to fall in combat.

Defending against that attack is one reason why, as Brown notes, companies such as DG and HP are boosting their low-end products. They need to support more powerful personal computers in departmental situations and provide bridges and migration paths to their own host systems. They also have to provide one-stop shopping services to small businesses that start with Microvax-class minicomputers and plan to add power as their firms grow.

A dozen or more vendors are looking for what might be two or three positions behind IBM and DEC. In the near term, that could mean a buyer's market in which users can demand the best by holding the threat of moving to the competition over the heads of their vendors.

L/F Technologies adds Unix-based systems

Aims Cubix line at departmental mart

By James Connolly

CARSON CITY, Nev. — L/F Technologies, Inc. recently introduced two Unix-based multiuser systems that the company claims are software compatible with the AT&T PC 6300 Plus microcomputer.

L/F Technologies, which also sells a 30-user system running Software 2000's Turbodos, is targeting the Cubix^3 and Cubix^2 systems at the small business and departmental office automation markets.

A company spokesman said a key feature of the Cubix systems is their ability to run Unix-based software written for the 6300 Plus on systems that have been optimized for Unix.

Based on Intel 80286

He added that, unlike the 6300 Plus, the Cubix systems do not run Microsoft Corp. MS-DOS.

The Cubix systems are based on the Intel Corp. 80286 microprocessor. The systems are said to use an intelligent Ethernet controller based on the Intel 80186.

The Cubix^3 was designed to support 14 users, 1M to 8M bytes of random-access memory (RAM), 16 serial I/O ports, 29M to 440M bytes of hard disk storage and an optional Intel 80287 math coprocessor.

The product is also said to support a tape backup and L/F Technologies' L/F-Power uninterruptible power supply option.

The basic system with 1M byte of RAM, 16 ports, a 29M-byte hard disk drive and a 1.2M-byte floppy disk drive costs $5,995.

The L/F-Power option costs $795.

The basic Cubix^2 system supports six users with 1M byte of RAM, eight serial ports, 29M bytes of hard disk storage and a 1.2M-byte floppy disk drive and costs $4,795.

Options include up to 4M bytes of RAM, 220M bytes of hard disk storage, a tape backup, L/F Power and the 80287 coprocessor.

System/36, 38 users unconcerned

From page 19

Users who foresee needs for capacities beyond current System/36 and 38 performance levels said they hope IBM will provide a migration path that enables them to run their portfolio of applications. In that vein, some users suggested IBM will eventually meld the System/36 — which they said has essentially reached its capacity limit — into the System/38 family.

IBM tied the architectures closer together in June when it brought out new versions of the System/38's CPF and System/36's SSP operating systems that support Advanced Program-to-Program Networking and unveiled a pass-through facility to allow System/36 users access to System/38 applications.

"I think you'll see an internal bridge between the System/36 and 38 by the end of 1987 at the earliest or soon thereafter," noted Robert Himmel, president of REM Associates, a New York software developer.

Architectures to merge?

Ron Kunschaft, a consultant in North Arlington, N.J., noted that since the System/36 and 38 were both developed at IBM's Rochester, Minn., facility, the firm must have a plan to blend the two architectures.

"There'll be a meeting place for the two," he contended. "Whether it is a bridge or a box that runs both systems' operating systems, I don't know. Maybe there will even be a box to tie both systems into the 370 architecture."

There is precedent within the System/36 and 38 world for such a transition, users said. When IBM discontinued the System/34, they recalled, the firm provided a migration path to the System/36, which at the time appeased their requirements for increased capacity and application software continuity.

Despite reports of some user dissatisfaction with the System/36 and 38, many attendees at the show claimed they would rather wait for IBM to provide better solutions within their architectures than switch to competitors' systems.

"They are good departmental computers for small business applications," REM's Himmel noted. "The problem is some users tried to make the 36, in particular, do more than it was supposed to do in the area of distributed data processing or as a full-blown mainframe. It's not either."

Yet some users' patience is running out.

Bell & Howell's Long said he is currently deciding whether to upgrade from a System/36 to either a 38 or a Digital Equipment Corp. VAX 8800. His hardware selection is based solely on an evaluation of each firm's office automation software. "We were satisfied with the System/36's performance but we need a more powerful system," Long said. "We're considering a VAX because we already have one running computer-aided design and manufacturing that we like. We are waiting to hear from IBM on how we'd run the business applications we already have on the System/38, but in the past, IBM's software enhancements have been poor."

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Fujitsu revamps Pick-based line

From page 19

our business users."

Since introducing its first System 2000 business computer in early 1985, Fujitsu has been targeting value-added resellers of Pick-based systems.

Prices start at $8,250 for the new Intel Corp. 80286-based four-user System 2000D.

The base system includes 128K bytes of random-access memory, the Pick operating system and a built-in 85M-byte hard disk drive.

The base four-user System 2000D configuration also includes a color monitor and a serial port in addition to a parallel port.

Dropping System 2000A

The company will no longer market its System 2000A, which was equipped with a 13M-byte hard disk drive, or its Micro 16S series.

The Micro 16S series runs the Microsoft Corp. MS-DOS and Digital Research, Inc. CP/M single-user operating systems.

By using the added version of the Pick operating system, the Micro 16S series machines have the ability to support up to four users.

With recently announced additions to the company's Common Network Architecture, the new version allows IBM Personal Computers to be linked to the Fujitsu systems.

Under the networking scheme, IBM PCs can function either as intelligent terminals or as network workstations capable of running both IBM PC-DOS and Pick programs.

The operating system software is priced at $495; the respective prices of the two editions are $199 and $595.

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SOFTWARE & SERVICES

SOFTLINE
George Tillman

DB2 demands DBMS move

DB2, IBM's 2-year-old relational data base management system, is threatening the survival of independent DBMS vendors.

Data base management systems became commercially viable in the mid-'70s as MIS organizations moved to integrated, on-line applications. IMS, IBM's primary DBMS, failed to match the features, ease of use and efficiency provided by competitors' products. By 1985, 80% of DBMS product sales were going to IBM competitors, up from 40% in 1981, according to the Focus Research Group's July 16 report.

The eroding IMS market and a commitment to software revenue have prompted IBM to revitalize its data management products. The company's new flagship product, DB2, is a relational DBMS. It replaces the aging IMS and may steal shares back from independent vendor products. Although DB2 has limited features and is deficient in transaction-intensive environments, it is enjoying early success with an estimated installed base in excess of 900, according to Paul Hessinger of Computer Task Group, Inc.

At least part of DB2's success can be attributed to the way it is marketed. Unlike the independents' products, DB2 can be leased, facilitating trials of the product. Further, rumors suggest, and many MIS directors believe, that DB2 will be needed to maintain the

See **DB2** page 27

Tillman is a senior associate with the Information Technology and Management practice of Booz, Allen and Hamilton, Inc. in New York, specializing in data base technology.

Tool builds on user feedback

By Ninamary Buba Maginnis

WILMINGTON, Del. — A large chemical company has adopted a software development method that builds in feedback from end users and can boost productivity as much as 600%, company officials said.

The methodology is called Rapid Iterative Production Prototyping (RIPP). Because end users are involved throughout the development cycle, the applications fit their needs, said Scott R. Shultz, manager of Information Engineering Associates, an arm of Du Pont Co.

Traditional software development consists of five phases: analysis, design, construction, testing and implementation. Fourth-generation tools are mostly applied to the construction phase, Schultz said, and "don't impact much of the project."

RIPP combines the phases and eliminates the need for a time-consuming analysis. Instead, a work request for an application is submitted within three days of the end user's request. Then a two-week definition stage defines the application in high-level terms.

The third phase is what productivity expert James Martin calls a "time box," Shultz said. In this final phase — which usually takes about 60 days — the program developers build the initial model using the Application Factory, an application generator from the Waltham, Mass.-based Cortex Corp. The system runs on the Digital Equipment Corp. VAX.

Although the first application model is incomplete, it is shown to users immediately, Shultz explained. End users then point out where the application is inadequate and, within a day or two, developers produce a second version. The iterative process continues for about 60 days, and the end result is an almost foolproof application, Shultz said.

As the developers repeatedly show the application to users, it is being tested, Shultz explained. "The users know exactly what the system does while it is being developed," he added.

Du Pont's first project was to replace an existing Fortran application that packed,

See **TOOL** page 28

Unix real-world testing offered

By Jean Bozman

CHICAGO — Large Unix users, such as the U.S. Army, MacDonald's Corp. and Hughes Aircraft Co., have used a Chicago-based benchmarking service to help weed out Unix systems that will not work in their computing environment.

The service, called Business Benchmark, is provided by Unix consulting firm Neal Nelson & Associates.

For about $100, customers can receive an 18-page printout comparing any two of the 120 Unix machines tested by Nelson & Associates. For $500 a month, they can rent a single copy of the firm's software so they can do testing on-site. Among the systems available for comparison are AT&T's 3B line, Unisys Corp.'s 5000 series, Digital Equipment Corp.'s Microvax and VAX-11/

See **UNIX** page 28

Vendor to offer Focus support on Token-Ring net

By Charles Babcock

NEW YORK — Information Builders, Inc. has announced support for its PC/Focus-Multiuser fourth-generation language and data base management system on the IBM Token-Ring network, the AT&T Starlan Networks and Banyan Systems, Inc.'s Vines network.

It also announced that it has introduced a Unix version of Focus for the AT&T 3B line of minicomputers.

PC/Focus-Multiuser uses a dedicated data base machine to control the flow of information between a user's IBM Personal Computer and the shared data bases. An IBM Personal Computer AT serves as the data base machine and coordinates traffic

See **VENDOR** page 27

NEW THIS WEEK

- Leland, Inc. offers Customer Order Servicing and Materials Requirement Planning modules for IBM 4300 and 3000 series mainframes
- For more on this and other new products, see pp. 91-103.

INSTANT ANALYSIS

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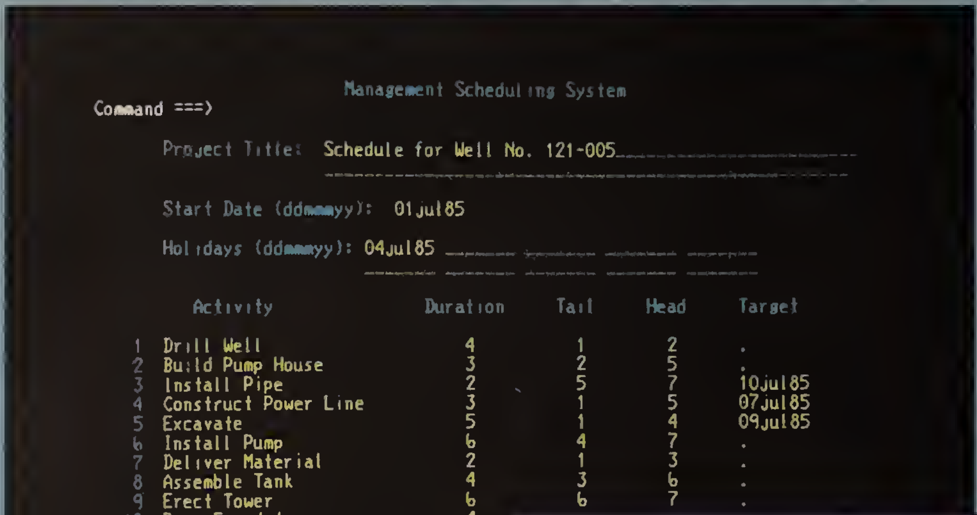

```
                        Management Scheduling System
Command ===>

         Project Title:  Schedule for Well No. 121-005___________________
                         ________________________________________________

         Start Date (ddmmmyy):  01jul85

         Holidays (ddmmmyy): 04jul85 _______ _______ _______ _______
                             _______ _______ _______ _______ _______

            Activity                Duration    Tail     Head     Target

     1   Drill Well                    4          1        2        .
     2   Build Pump House              3          2        5        .
     3   Install Pipe                  2          5        7      10jul85
     4   Construct Power Line          3          1        5      07jul85
     5   Excavate                      5          1        4      09jul85
     6   Install Pump                  6          4        7        .
     7   Deliver Material              2          1        3        .
     8   Assemble Tank                 4          3        6        .
     9   Erect Tower                   6          6        7        .
    10   Pour Foundation               4
    11   ______________________       ___
    12   ______________________       ___
    13   ______________________       ___
    14   ______________________       ___
    15   ______________________       ___

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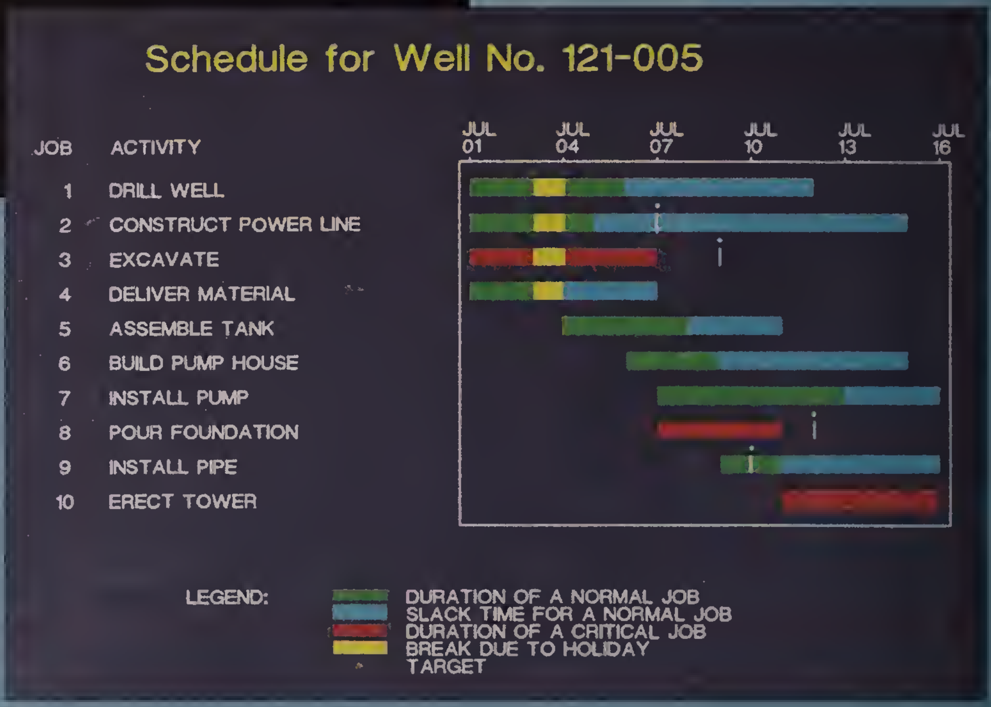

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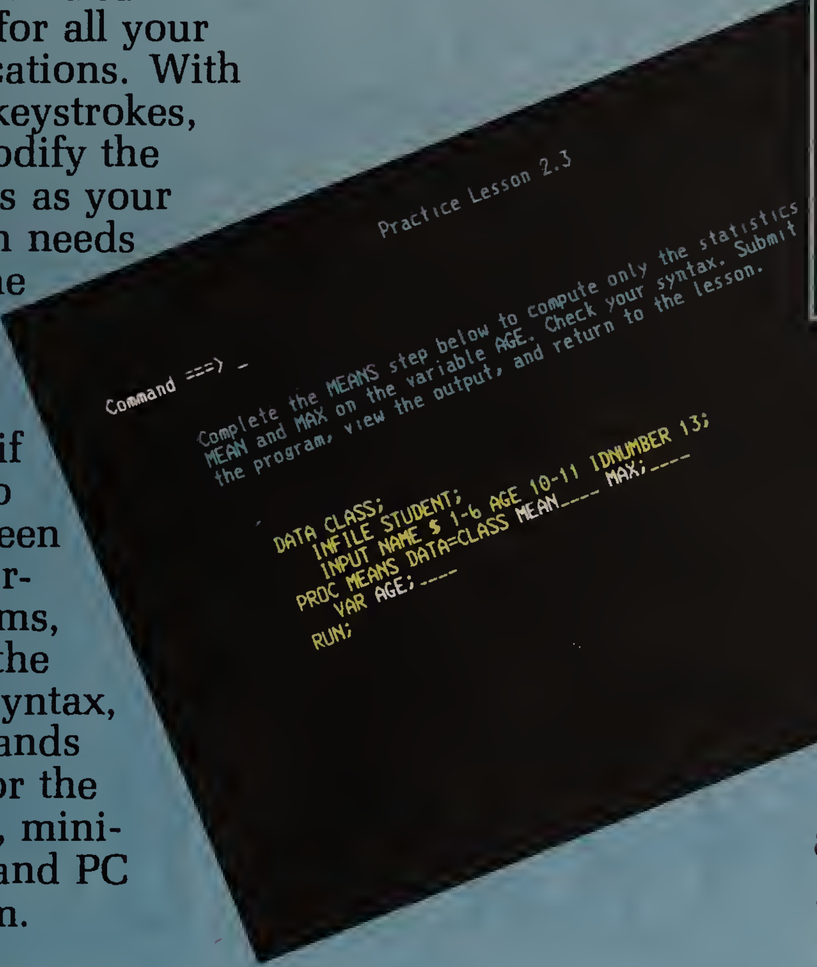

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Practice Lesson 2.3

Command ===> _

Complete the MEANS step below to compute only the statistics
MEAN and MAX on the variable AGE. Check your syntax. Submit
the program, view the output, and return to the lesson.

DATA CLASS;
  INFILE STUDENT;
  INPUT NAME $ 1-6 AGE 10-11 IDNUMBER 13;
PROC MEANS DATA=CLASS MEAN____ MAX;____
  VAR AGE;____
RUN;
```

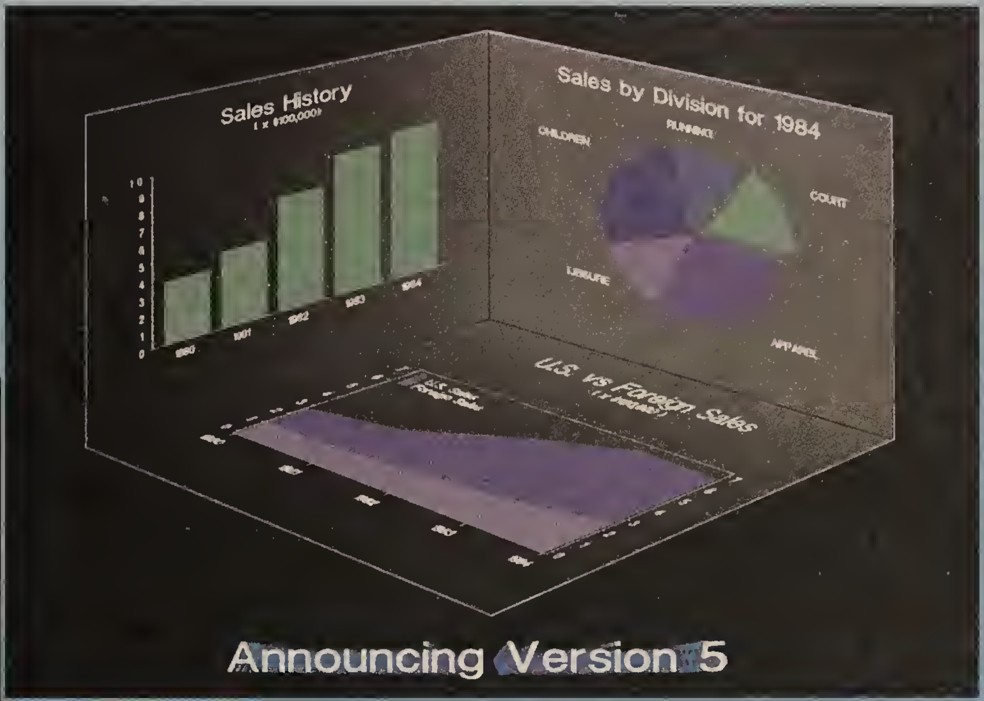

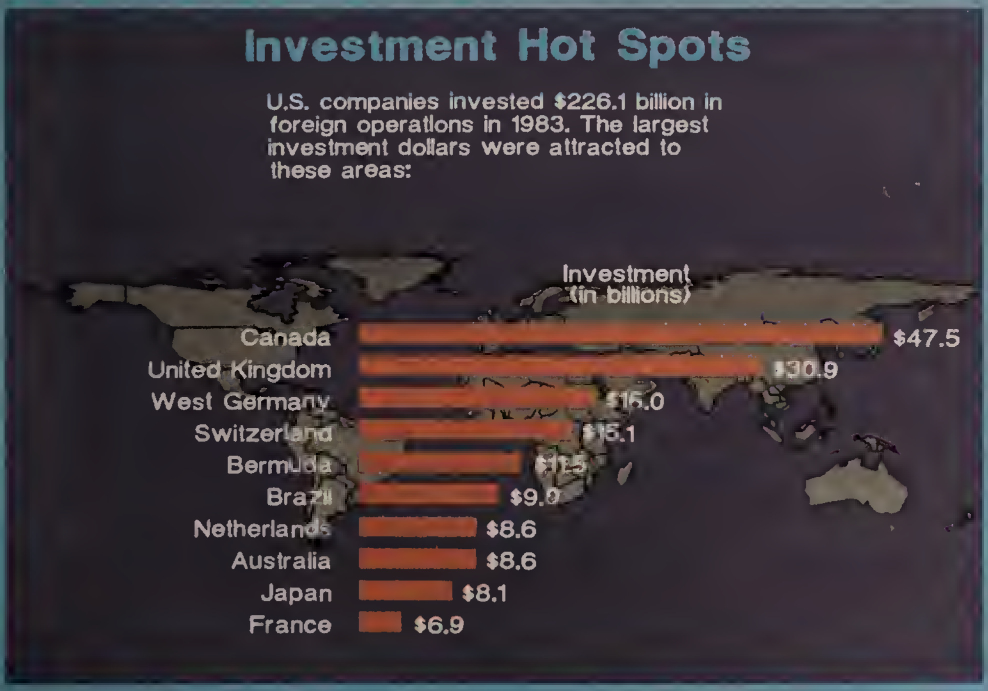

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DB2 demands DBMS move

From page 23

IBM operating system's long-awaited super data dictionary. Acquiring DB2 may provide a head start on the inevitable. In addition, the IBM name continues to be a powerful drawing card.

Where does this leave the independents? DB2 has already hurt independent DBMS vendors. With a new type of product to evaluate, MIS organizations require more time to select DBMS products, thereby deferring independents' revenue. Furthermore, sales are being lost to DB2. Although many of its early sales are going to existing IMS users, sales growth is being taken away from the independents. The result is that long-time revenue generators, such as Cullinet Software, Inc. and Applied Data Research, Inc., are experiencing revenue shrinkage.

Will the independents be able to survive DB2's onslaught? It is possible for them to coexist in a DB2 world without losing revenue. What is required is a strategy that properly reacts to the DB2 phenomenon.

Some of the independents are already reacting to DB2. Applied Data Research, Software AG of North America, Inc. and Cullinet have all announced they are modifying their products to be somewhat compatible with DB2. Eventually, applications will be written to run on either their DBMS or on IBM's DB2, making IBM's SQL — the DB2 interface — a standard. Though appearing at first to be a strange strategy, it may save the independents.

The DBMS marketplace can be depicted in terms of three concentric circles. The nucleus of the model is the DBMS. The middle ring contains system support software, such as data dictionaries, report writers and application generators. The outer ring contains DBMS-based application packages, which use the products in the two inner circles.

IBM has held a strong position in the DBMS nucleus, and DB2 is solidifying that position. But the independents have always outperformed IBM in the middle and outer rings. The independents could concede a DBMS victory over IBM, exploiting their own strengths relative to IBM's support software weaknesses. Watch for the independent DBMS products to become SQL-compatible in one of three ways.

- Vendors may restructure their DBMS to be DB2 compatible, thereby allowing their products to run all DB2 software.
- Vendors may maintain unique DBMS offerings, but support an SQL interface. The actual architecture of the product would change very little. Rather, an interface between the user and these DBMS products would support the SQL language. The independent's product would feature some specialty, such as transaction processing, an automated AI-based data base administrator function or user-friendly interfaces.
- Other vendors might abandon the DBMS marketplace to DB2 and focus entirely on system support and application software for DB2-compatible products.

Expect independents' DB2- or SQL-compatible products to encompass a number of extensions. These could exploit DB2 weaknesses, such as performance, language support or user unfriendliness.

SQL-compatible DBMS products will permit independents to concentrate on system support and application software products where they have been the most successful in the past. SQL compatibility will also expand the independent vendors' market to include support for DB2 or other SQL-based applications.

Surviving DB2 will require a careful repositioning of independents' strategies. Opportunities will increase for DBMS users, including traditional IBM shops, to turn to independent products such as Applied Data Research's Ideal or Cullinet's Ads/Online for developing applications on their IBM or other SQL-compatible DBMS.

Vendor offers Focus support

From page 23

during a Focus session, Information Builders spokesmen said.

Unlike some local-area network products, which use Microsoft Corp. MS-DOS locking facilities, PC/Focus employs its own record and file non-locking transaction check, ensuring no conflict of users trying to simultaneously update a data base record, the IBI spokesmen said.

The product is available in four-, eight- and 16-user versions, costing $1,995, $4,000 and $6,000, respectively.

The AT&T Starlan Network allows users to link IBM PCs to the AT&T 3B minicomputer series. PC/Focus-Multiuser communicates with the network through the IBM Netbios interface calls, making the Starlan compatible with the IBM networking standard, according to David Feldstein, vice-president of the micro products division. Similiar to support for the IBM Token-Ring, the Starlan system includes a PC AT as a data base machine and operates with a transaction checking facility rather than record locking.

The Banyan Vines operating system allows users to bridge several Vines networks using Banyan's Street Talk facility. A user on one network has access to resources on others, IBI spokesmen claimed.

Prices on four-, eight- and 16-user networks are the same for these products as the IBM Token-Ring Network version.

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Tool builds on user feedback

From page 23

weighed and labeled bulk continuous fiber at its Camden, N.C., plant. Developers mapped out the program flow with pictures and lines on a terminal screen.

When the mapping was finished, the Application Factory automatically coded 90% of the program, leaving only 10% to be done manually, Shultz said.

Two developers completed the program in two months and, factoring in overtime, put in five months' effort.

Under normal conditions, the project would have taken more than 30 months, Shultz said.

"We were astounded. The bad part is nobody else believed it," he noted. The company built two more applications at its Richmond and Waynesboro, Va., sites and duplicated the results, Shultz said.

Since then, the methodology has been growing in popularity, extending from the firm's Textile Fiber Department to its Chemical and Pigment and Automotive Products departments.

Faster development cycle

One problem has been getting users accustomed to receiving versions of their applications almost as soon as they request them, Shultz said. Traditional methods meant a one- to three-year development cycle.

End-user Joseph Sullivan, supervisor of computers for Du Pont's textile fibers division in Waynesboro, said the development tool pushes users to train quickly because applications are delivered within 90 days.

In some cases, end users are inundated and have a slight backlog of applications waiting to be implemented.

Also, performance is sacrificed in favor of speedy production, Sullivan said. The old DEC PDP-11/34 ran a Fortran application that produced reports about four times faster than the Cortex application on the VAX-11/785, Sullivan said.

"The PDP program evolved over the years and was tweaked for speed and capacity," he noted.

The slower applications are written in Cortex's Cobol-like Builder code, which can be maintained by Cobol programmers, company officials said.

Even the program development team is having its troubles. "I don't want you to think for a minute that our method is foolproof," Shultz said. Getting hardware delivered to go with new applications, training users, working out union issues and a host of other factors that used to be addressed in a one- to three-year time frame are now dealt with almost immediately, he said.

The Application Factory is still being cleaned up. It produces high-quality code, Shultz observed, but sometimes performs in an unpredictable manner.

"You press a button to do something and it doesn't do exactly what it's supposed to do. That's true of most tools on the market," Schultz said.

Cortex is quick to provide support, he concluded.

Unix real-world testing offered

From page 23

780 line, Encore Computer Corp.'s Multimax, Sequent Computer Systems, Inc.'s Balance series, the NCR Corp. Tower line and the IBM Personal Computer AT and RT PC.

"There are other people who do benchmarks," says Casey Powell, president of Sequent Computer in Portland, Ore., which has used the Business Benchmark. "But most of them don't tell you how a computer will act in a real-world environment."

What Business Benchmark does is provide a data base of tests for the Unix systems, allowing customers to pair off any two for side-by-side comparison, according to the consulting firm's President Neal Nelson. He developed the benchmarks over time by comparing ways in which financial applications ran on various Unix systems.

Compares Unix versions

Nelson's software allows for comparison under a number of versions of Unix, ranging from Xenix to University of California at Berkeley Version 4.2 and AT&T's System V Release 2.

Each Unix system is tested 14 ways to determine the speed with which it does floating-point operations, how it handles disk I/O, how well it does calculations and how it reacts as more users log on. The resulting Business Benchmark report compares systems by listing the number of seconds required to complete a given task. Then, it shows how the system slows down as 20 to 100 users log on — presenting the slowdown both numerically and in a graph format.

The initial testing that created Nelson's data base was intended to be thorough — the DEC VAX-11/780 test ran for 18 hours to generate all the input required by the benchmark.

"You can never simulate exactly someone's computing environment," says Robert Mandl, a senior scientist with Hughes Aircraft's Technology Support Division in El Segundo, Calif. "But Nelson has provided benchmarks that demonstrate performance under load. He's made a real attempt to emulate a real-world business environment."

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MICROCOMPUTERS

MICRO BITS
William Zachmann

Time to take Mac seriously

I learned Fortran on IBM 7094s as an undergraduate in 1961 and Cobol, 360 assembly language and PL/I in the mid- and late 1960s. I was trained as an IBM OS and, later, VM systems programmer. So I never thought it could happen to me. But it did.

Yup, there's no denying it. Unpacking a brand new 1M-byte Apple Computer Corp. Macintosh Plus with a Hard Disk 20, my hands shook like they did when I was 13 years old and went on my first date with a girl. I mean, what's a hard-core IBM PC-DOS macho man like me doing with a damn Macintosh, anyway?

Facing the inevitable, that's what. And the inevitable is that the Macintosh, by being easier to use and less threatening to nontechnical users and by offering an easy route to superb-quality marks on paper (desktop publishing, I think it's called), has confounded the skeptics and naysayers and established a solid and secure beachhead in an astonishing range of businesses.

The turnaround has really been quite remarkable. Just a year ago, surveys of corporate personal computer purchasers showed about as much interest in the Macintosh as the Ayatollah Khomeini has in attending prayer meetings with Jerry Falwell. By last summer, something had changed dramatically. Interest in the Mac had increased spectacularly.

Don't get me wrong. The IBM Personal Computer family and compatibles

See **TIME** page 33

Zachmann is vice-president of research at International Data Corp.

Lee Data offers connectivity

AT-compatible units tie into large systems, nets

By David Bright

MINNEAPOLIS — Lee Data Corp. recently introduced a line of intelligent IBM Personal Computer AT-compatible workstations designed for personal computer processing and connectivity to larger systems.

"The Series 80 family of intelligent workstations is in direct response to our users' overriding need for performance and connectivity," said John Roy, group vice-president of marketing. "These intelligent workstations combine the high performance and compatibility of the PC AT with a variety of mainframe connection options.

"For example," Roy added, "when interfaced to a Lee Data controller, the Series 80 user can communicate with multiple-host processors in IBM 3270, asynchronous, T1 or CCITT X.25 modes."

For IBM mainframe connectivity, the Series 80 family can be configured through IBM controllers, Lee Data controllers or protocol converters. In addition, the workstations can be used with a variety of local-area networks, including those that are token-ring- or Ethernet-based.

When used with Lee Data controllers, the workstations support multiple windows, simultaneously displaying on-line 3270, asynchronous and personal computer sessions, according to the vendor.

Priced at $4,935, an Intel Corp. 80286-based Model 80 workstation comes with 640K bytes of random-access memory, a 20M-byte hard disk drive, a 1.2M-byte floppy disk drive and eight expansion slots. With an enhanced graphics display, the workstation costs $5,880.

The Model 83, which costs $7,870, includes a display system for color and host graphics, an enhanced 122-key keyboard, window control software and an integrated adapter to a controller system. A 40M-byte hard disk drive option for both workstations costs $425.

Firms roll out tool expansions

By Eddy Goldberg

HANOVER, N.H. — True Basic, Inc. of Hanover recently announced True Basic 2.0 for IBM Personal Computers and compatibles, claiming to be the first Basic product to support the full range of graphics display cards used on the IBM PC.

The True Basic product reportedly supports cards from Hercules Computer Products, Inc. and IBM's Enhanced Graphics Adapter and Color Graphics Adapter cards, said Chris Walker, vice-president of engineering.

With True Basic 2.0, users can, for the first time, create a sophisticated graphics program that runs on all three display types without modifying code or using special drivers or overlays, Walker said.

Another enhancement is the commercial introduction of modules to Basic, which will help programmers develop large applications, said True Basic Chairman John Kemeny, coinventor of the original Basic programming language.

Performance in Version 2.0 has been boosted by a factor of 2-to-3 over the previous release, and there is improved support for Intel Corp. 8087 and 80287 numeric coprocessors.

Maximum string length has been increased to 64K char./string, and the new release continues to support 640K bytes of memory on the IBM PC and compatibles. Shipment is set for mid-December with a price of $149.90.

In a separate development, Microsoft Corp. recently announced three products aimed at improving the programming environment for the Apple Computer, Inc. Macintosh.

Microsoft unveiled the Microsoft Basic Compiler and released Version 3.0 of the Microsoft Basic Interpreter and Version 2.2 of the Microsoft Fortran Compiler, all for the Mac.

See **FIRMS** page 33

INSIDE

Expertelligence releases LISP compiler for the Mac/**37**

System converts expansion chassis into a rugged IBM PC-compatible industrial computer/**37**

NEW THIS WEEK

- Computer Innovations introduces C86 Plus C compiler
- For more on this and other new products, see pp. 91-103.

INSTANT ANALYSIS

"If the 386 chip had been done on the same schedule as the 286, there'd be no question about which is more elegant. But we need to support the 286; it's here."

— Steve Ballmer, Microsoft Corp. vice-president of systems software, on the issue of writing operating systems software for the Intel Corp. 80286 and 80386 microprocessors.

Oracle launches ALLIANCE program for software VARs

Oracle Corp,. supplier of the ORACLE distributed relational DBMS and application development tools, has announced a new program for software value-added relicensors dubbed the Oracle *Alliance* program. The program offers broader markets, simpler, faster selling cycles, and shorter time-to-market for VARs who build or convert their applications to use Oracle's products.

According to Larry Harman, Oracle's Director of the VAR program, "We offer major business benefits to VARs who choose to use ORACLE with their products. Chief among these benefits is ORACLE's portability and the portability of ORACLE-based applications, allowing applications and data to be shared among different machines. Oracle also provides the link software to exchange database information among the different machines."

Broader VAR Markets

ORACLE runs on the widest array of hardware: IBM mainframes under MVS and VM, most vendors' minis under both proprietary and UNIX operating systems, and PCs under MS/DOS. Oracle also developed SQL/RT, marketed by IBM on the RT PC.

Harman states, "Only with ORACLE can an application developer produce software on one system and *inherit* a vast market of users of multiple vendors' hardware. Basically, we let our software VARs do *blindfold selling*."

"Blindfold Selling"

The company described "blindfold selling" as the ability of a VAR's salesman to walk into an end-user site blindfolded and say, "I don't know what types of hardware you're using, or how many types there are, but my applications run on all of them."

Harman points out that VARs have a tough decision to make concerning what hardware to implement on. With ORACLE, that decision needn't be made. Software VARs who establish a niche in a particular vendor's install base can take advantage of ORACLE's portability to sell in other hardware environments.

Shorter Time To Market

The company also cited the high level of productivity offered to VARs by Oracle's broad range of application tools, including a forms system, integrated spreadsheet, graphics and other tools. These yield development and maintenance efficiencies that translate into shorter time-to-market and lower costs.

And, Harman adds, "ORACLE is the most complete and mature SQL-based DBMS on the market. SQL is becoming a national standard, so developing applications with an IBM-compatible, portable DBMS makes business sense in both private-sector and public-sector markets."

Harman concludes, "Generous discounts plus support, training and co-marketing combine to make the Alliance program an outstanding opportunity for software VARs."

Oracle Corporation, founded in 1977, builds and markets the ORACLE distributed relational DBMS, 4GL and DSS tools. ORACLE was the first commercial SQL-language DBMS, and is compatible with IBM's DB2 and SQL/DS DBMSs.

ORACLE provides a standard software environment across a wide range of computers and operating systems, including IBM mainframes, minicomputers from DEC, DG, ATT, HP, Stratus, IBM, Apollo and many others, and IBM PCs. ORACLE runs with IBM's MVS and VM/CMS, DEC's VAX/VMS and DG's AOS/VS among others, as well as with UNIX on most systems.

All versions of ORACLE, from the mainframe to the PC implementation, are identical. ORACLE is the only relational DBMS which provides the complete portability of data and applications across a wide variety of systems. Oracle's SQL*Star architecture links dissimilar systems running ORACLE.

Oracle Corporation markets its products worldwide through 30 direct sales offices, 11 distributors and the Authorized Oracle Dealer network. In addition, ORACLE is sold by numerous hardware manufacturers, including IBM, Honeywell, Sperry, Stratus and Prime.

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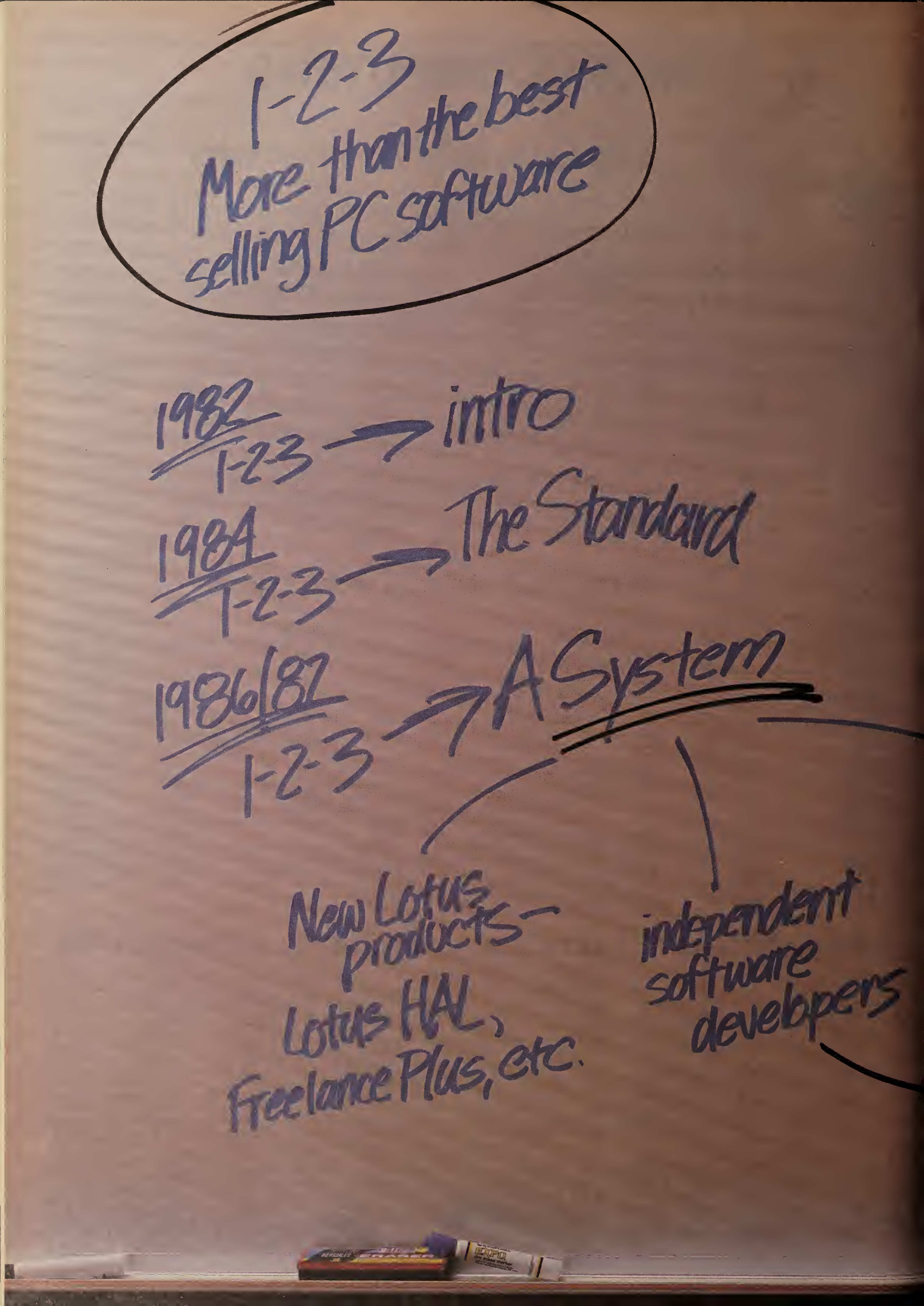
For additional information, contact Larry Harman, Director, VAR Marketing, Oracle Corporation, 20 Davis Drive, Belmont, CA 94002 or call 800-345-DBMS.



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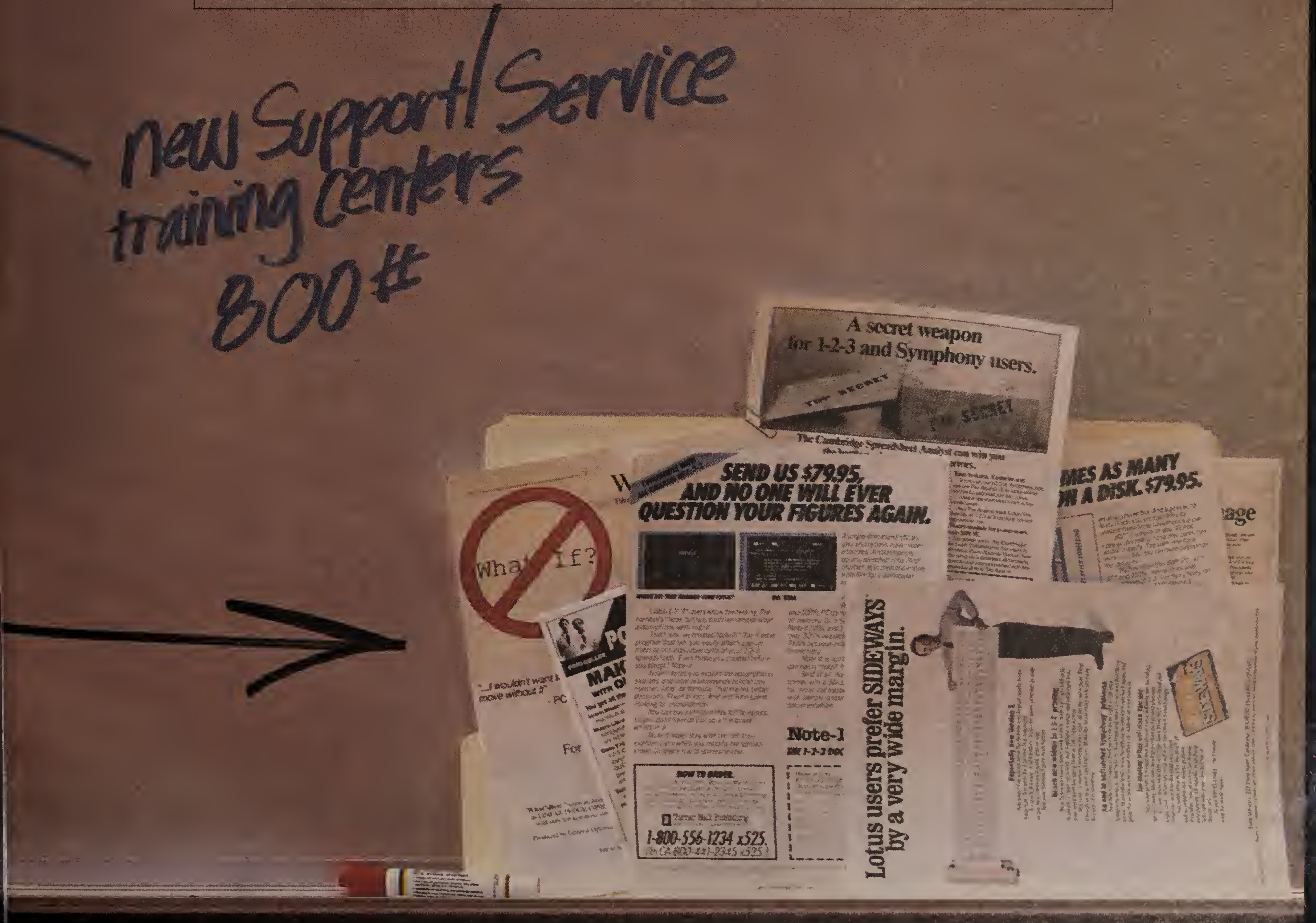
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Time to take Mac seriously

From page 29

continue to dominate the corporate desktop, at least officially. But Macs have been turning up in some of the most astonishing places. Even in the tiny minority of organizations that are such runaway control freaks that they prohibit anything but IBM (or IBM compatible) systems, determined users still sneak home to their Macintoshes at night.

I also had a most astonishing conversation recently with an information systems executive. His organization had developed a restrictive micro policy requiring that users use one of three vendors' machines — IBM, Compaq Computer Corp. and Zenith Data Systems Corp., if I remember correctly.

The president, however, after getting an IBM PC AT, becoming frustrated with it and turning it over to his secretary, began using his teenage daughter's Macintosh. He was so enthusiastic about how much easier it was to use that he now has one in his office and wants to know why the company isn't using them.

Joining the caravan

So I decided it was high time that I started using a Macintosh, too. Not that I'm going to give up my IBM compatibles, mind you. But with the evidence mounting that the Macintosh is here to stay, I thought I'd better get on the caravan before it leaves without me.

So from now on, I'll occasionally be looking at Macintosh hardware and software products in this column in addition to those for the IBM PC family and compatibles. As always, I'll try to focus on products that I think are most likely to deliver real value to corporate business users.

If you are not familiar with the Macintosh and how it works, it may not be apparent to you what all the fuss is about. In a world where many users are still using IBM monochrome monitors, the relevance of a graphics interface like the one the Macintosh has isn't easy to appreciate.

Setting up a Macintosh and turning it on for the first time is most definitely a different experience from putting together your first IBM PC. For openers, you don't need pliers or a screwdriver.

One characteristic of the Macintosh has been cited by various industry gurus as a reason for not taking it seriously: its size. Based on my initial experience with the Mac, I have come to suspect that, on the contrary, this may be one of the keys to its success.

Sure, I can sympathize with the initial perception that anything that small can't really be a serious business machine. But even a little impartial consideration of what the darn thing does will quickly dispel that prejudice. And it doesn't take long to realize what an enormous advantage it is having a powerful personal computer that is so small.

In the first place, unlike the IBM PC family — including compatibles — the Macintosh easily fits on a normal-size desk. I've got mine sitting with lots of room to spare on a small desk that previously held an IBM-compatible system precariously cantilevered over the back so there would be room for the keyboard.

But the real advantage of the Macintosh is the bit-mapped graphics interface that lets you do all the things you do through PC-DOS commands by moving a cursor around with the mouse pointing device, pointing to menus, dragging icons and the like. That and the incredible versatility that true "what you see is what you get" graphics brings to the party in creating documents add up to major advantages for users.

With products now available to link the Macintosh with IBM PCs and compatibles in networks, as well as with larger systems, there are no convincing reasons why corporate users who prefer the ease of use and superior desktop publishing characteristics of the Macintosh should be denied.

Firms roll out tool expansions

From page 29

The Microsoft Basic Compiler, priced at $195, is set for Dec. 1 availability and allows programs written in Microsoft Basic Interpreter to be compiled with little or no modification. The compiled programs will then execute from 10 to 30 times faster, Microsoft said.

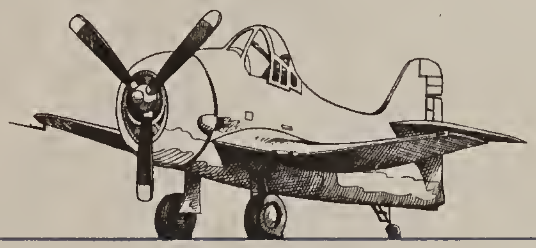
Rob Dickerson, Microsoft group product marketing manager, said the compiler will give developers the performance they need for developing sophisticated business programs for the Macintosh.

Key features of the compiler include support for block IF/THEN/ELSE/END IF statements, SELECT/CASE statements and fully recursive subprograms. It also supports the Macintosh Plus, including the ability to access 1M byte or more of memory, as well as the Apple Laserwriter.

A Toolbox Library, licensed from Clear Lake Research in Houston, is included with the compiler. It contains more than 140 software routines that facilitate access to the Macintosh Toolbox read-only memory when creating applications.

Version 3.0 of the Microsoft Basic Interpreter, available immediately, is priced at $99, a 33% reduction. It comes with the Toolbox Library from Clear Lake and a runtime interpreter.

Both the Basic and Fortran compilers are licensed from Absoft Corp. in Rochester Hills, Mich. All three products will run on Macintosh systems with 128K bytes or more of memory.



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LISP compiler offers development tools for Macintosh

AI, vertical market applications planned

By Peggy Watt

SANTA BARBARA, Calif. — Expertelligence, Inc., developer of artificial intelligence language tools, recently announced Expercommon Lisp, a $995 LISP compiler for Apple Computer, Inc.'s Macintosh.

The product joins two other Expertelligence LISP development languages: Experlisp, also for the Macintosh; and Le Lisp, an implementation of the language for IBM Personal Computer-compatible systems, developed by ACT Informatique in Paris and distributed in the U.S. by Expertelligence. The Santa Barbara company also developed Experlogo and Experprolog for the Macintosh.

Now that it is armed with a library of development tools, Expertelligence spokesmen say the company will focus on designing and publishing AI applications developed with those languages. "There's no reason we shouldn't have a word processor or other common application using the tools of LISP," said Expertelligence President Denison Bollay. Such AI applications could involve intuitive word completion or built-in formatting, Bollay added.

Bollay said he also envisions several vertical market applications, including an architectural design program and desktop publishing. Expertelligence already markets several applications developed for its languages, including the expert systems Ops5 and Experfacts.

In addition, AI-tinged desktop publishing applications that take advantage of the Macintosh's graphical user interface are logical applications for one of the few Macintosh-based AI development tools, according to Louis G. Robinson, publisher of the AI industry newsletter "Spang-Robinson Report," in Palo Alto, Calif.

While restricting development of the Macintosh could limit Expertelligence's market, it is appropriate if the firm intends to focus on graphic applications, Robinson said. "They're trying to make Common LISP the standard across the country," he said. "I imagine they can reach a wider span as a result."

Expertelligence's implementation of Common LISP, which adheres to Defense Advanced Research Projects Agency standards, is a first for the Macintosh, said Harvey P. Newquist, editor of the "AI Trends" newsletter, published by DM Data, Inc. in Scottsdale, Ariz.

"That's good, because that standard is being embraced by personal computer developers and even workstations such as Sun Microsystems, Inc. and Apollo Computer, Inc. and Digital Equipment Corp.," Newquist said. "But the power needed to develop large programs is not inherent in the Macintosh yet. And because the Macintosh has not had the wide acceptance in corporate America that the PC has, the Macintosh as a LISP development machine is still a kind of isolated architecture."

Expercommon LISP features an object-oriented development environment, symbolic debugger, incremental compiler and complete access to the Macintosh toolbox, Bollay claimed. It requires a minimum configuration of a 512K-byte Macintosh, though a Macintosh Plus is recommended for development.

The development language is available for $995, which includes tutorial and a LISP development book. An optional file compiler costs $495, and a dead code analyzer is $1,500. Site licenses start at $1,350 yearly.

PC out to take rugged use

SAN DIEGO — ICS Computer Products has introduced a diskless IBM Personal Computer compatible for industrial uses. According to the company, the computer is ideal for converting an expansion chassis into a rugged industrial computer.

Called PC-Node/AT, the $1,695 unit is basically a five-slot expansion chassis with a PC/CPU286 processor card, a 100W power supply and fan. The chassis provides three IBM PC AT-compatible 16-bit slots and two IBM PC-compatible 8-bit slots. A five-slot expansion box made by the company can be attached to the unit, and several optional disk configurations are available.

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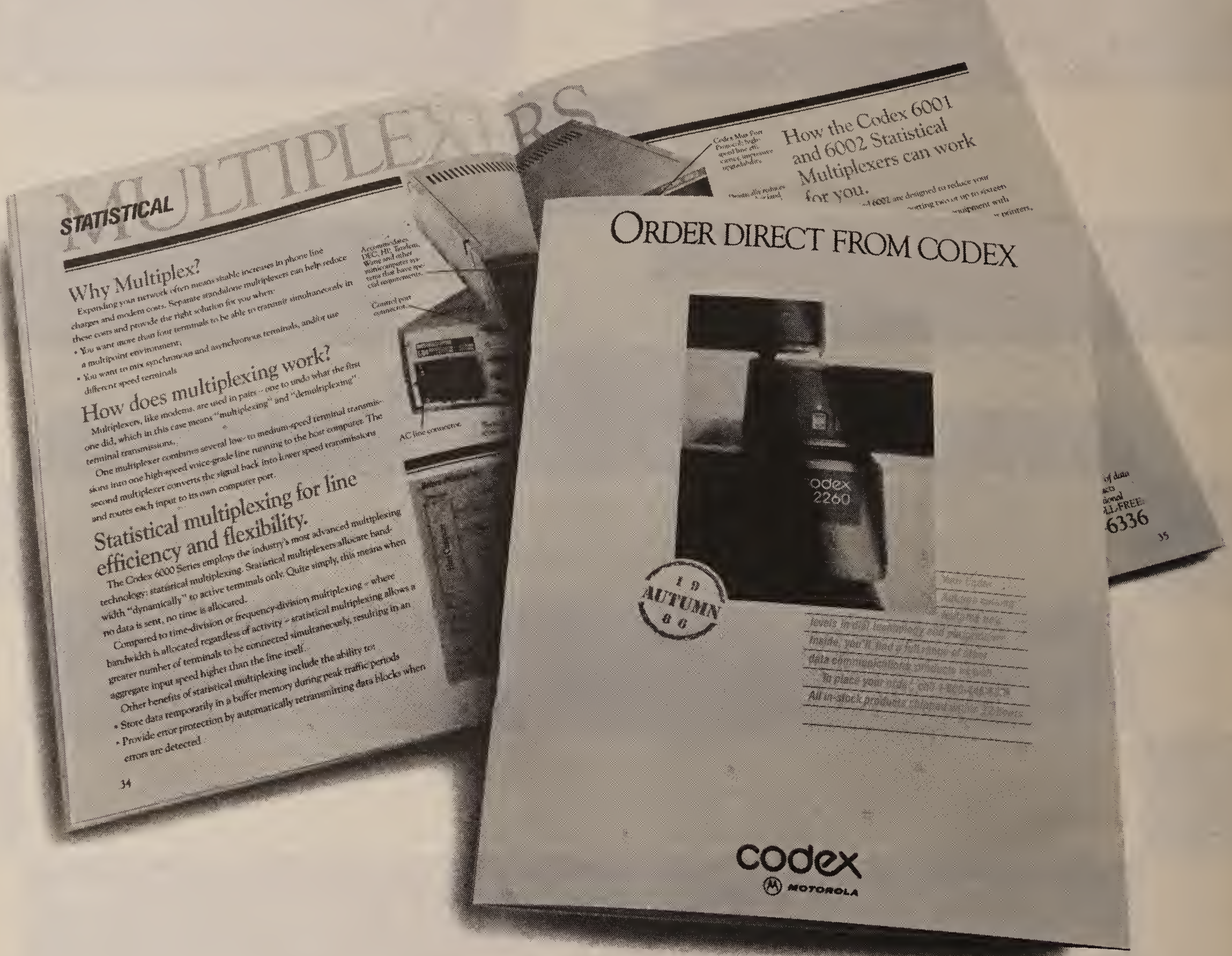

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COMMUNICATIONS

DATA STREAM
Elisabeth Horwitt

The promise of CIM systems

During my travels at the Autofact '86 conference held recently in Detroit, I encountered widespread confusion as to the true nature of computer-integrated manufacturing (CIM). A spokesman from McDonnell Douglas Manufacturing & Engineering Systems Co. defined CIM as "the ability to share data past its origin."

Company President John Clancy expanded on this somewhat.

CIM, he said, provides a flow of information linking various elements of the manufacturing process, from administrative systems such as sales and accounting through design and procurement and down through the ranks of devices that control manufacturing and production.

Vendors have found this CIM concept very useful indeed — as a buzzword to attract customers. Various Autofact exhibits placed under the CIM banner included everything from computer-aided design and manufacturing software to Materials Resource Planning II to a variety of communications offerings, some proprietary and some incorporating standards such as the Manufacturing Automation Protocol (MAP).

But the industry is a long, long way from the reality of an all-encompassing CIM system that allows intelligent devices on all levels of a manufacturing environment to share and exchange information.

Vendors such as IBM and Digital Equipment Corp., which offer a full line

See **PROMISE** page 43

Horwitt is Computerworld*'s senior editor, communications.*

VAX option converts text

Lets PC users exchange incompatible documents

By Elisabeth Horwitt

CALGARY, Alta. — The Vaxpak software package introduced recently by Keyword Office Technologies Ltd. allows personal computers running different word processing programs to exchange editable documents through Digital Equipment Corp.'s VAX-based All-In-1 office automation system.

"Users of IBM Personal Computers, Apple Computer, Inc. Macintoshes, DEC Vaxmates — anything that can hook up to a VAX — can exchange documents while still using their favorite word processing programs," said Jay Jaiswal, Keyword vice-president of marketing. "You send the document in your format, the recipient accesses it in his."

Documents are sent to the VAX and stored in electronic mailboxes by All-In-1's electronic mail system, which then sends a message to the recipient or recipients that mail is waiting. Vaxpak software causes the All-In-1 program to include in its user profiles the type of word processing software used by each participant in the electronic mail network. When a user accesses mail, Vaxpak translates the document into the correct word processing format.

Vaxpak translates a wide range of word processing document formats, including Ashton-Tate's Multimate, Wang Laboratories, Inc.'s Professional Computer, Samna Corp.'s Samna, Office Solutions, Inc.'s Officewriter, Microsoft Corp.'s Microsoft Word for the IBM Personal Computer and Macintosh, IBM's Data Interchange Format and Micropro International Corp.'s Wordstar. It also supports revisable form Document Content Architecture, the word processing format used by IBM's Professional Office System. This lets users ex-

See **VAX** page 42

IBM net exec talks open SNA

By Alan Alper

NEW YORK — The recently appointed president of IBM's Communications Products Division recently reaffirmed IBM's decade-old commitment to Systems Network Architecture (SNA) but emphasized that IBM is striving to keep the architecture open to connections by users and other equipment vendors.

In a presentation during a telecommunications forum sponsored by the DMW Group, Inc. of Ann Arbor, Mich., IBM's Ellen Hancock said his company's dual goal is to facilitate the attachment of non-IBM products within multivendor environments and also enhance connectivity within its own product lines.

Hancock emphasized the strides IBM has made to open SNA to both enhanced data and voice communications. She also pointed to the firm's continued support of

See **IBM** page 46

Vitalink wide-area network bridges to link more systems

By Peggy Watt

MOUNTAIN VIEW, Calif. — Vitalink Communications Corp. last week announced hardware and software products that enable its 802 WAN network-to-network bridge offerings to support additional host and terminal protocols.

Vitalink's 802 WAN product line connects multiple devices on two or more geographically separated Ethernet 802.3 local-area networks via Translan wide-area network bridges that support data rates of up to 2M bit/sec.

The recently introduced Trans Synchronous Data Link Control (SDLC) packages data transmitted between IBM 3270 terminals and hosts so that it can be sent over a Translan wide-area link. TransSDLC polls terminals for requests to transmit on one

See **VITALINK** page 46

INSIDE

Pacific Bell Telephone faces lawsuit/**42**

Westinghouse unveils optical-fiber MAP network/**46**

NEW THIS WEEK

- Sun Microsystems offers MAP implementation and other data communications products
- For more on this and other new products, see pp. 91-103.

INSTANT ANALYSIS

"Virtual network vendors like AT&T are too slow to provide a way to do user accounting and chargeback. They still can't separate out the different transmissions — voice, data and office automation — to say who is working on what."

— Kenneth Jankowski, manager of network services, TRW, Inc.

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Four on-line providers hit Pacific Bell with $30M lawsuit

Faulty accounting practices charged

By Jeffry Beeler

LOS ANGELES — Four providers of on-line information services have filed a $30 million lawsuit against a divested Bell operating company that allegedly stunted their revenues by relying on a faulty accounting system.

At issue in the providers' civil complaint against Pacific Bell Telephone Co. is whether the firm accurately measured customer use of the four firms' prerecorded telephone message services.

Each of the providers is managed by Skystar Corp., a holding company that accuses Pacific Bell of understating by 30% to 60% the number of calls to the plaintiff's Information Access Services (IAS).

Pacific Bell's omissions diminished Skystar's billings by more than $5 million since mid-1984, according to the complaint, which was filed on May 30 in Los Angeles County Superior Court. Although the company's suit was filed more than six months ago, word of the dispute is only now beginning to leak out to the public.

In theory, Pacific Bell's switching equipment automatically makes a record of each IAS call as it occurs. At the end of each month, the system then counts the number of calls to each service and computes their total revenue value. Under a formula dictated by the California Public Utility Commission's 976 tariff schedule, the phone company is authorized to deduct a specified share of its monthly collections as a service charge for the use of its facilities. The rest of the revenue is then distributed to the appropriate providers.

But in practice, the procedure works much less reliably than it should, Skystar claimed. The process's difficulties stem from outdated, error-prone technology incorporated into Pacific Bell's IAS accounting switching equipment, the plaintiff's attorney Ron Goldie said.

The alleged accounting errors suggested serious inadequacies in the divested Bell operating company's automated process of collecting IAS revenue and allocating it to the rightful recipients, the court papers said.

Initially, Pacific Bell remitted the provider for approximately 70% of its qualified customer transactions, Skystar said. With time, however, the percentage slowly but steadily dipped to its current level of only about 40%, Goldie said.

The most glaring of Pacific Bell's alleged undercounts have occurred since May when the plaintiff filed its suit. Last month, for example, "we got credit for only 40,000 of the 125,000 phone calls we know for a fact that one of our information services received," Goldie said.

Skystar can measure with precision its IAS customer traffic because each of its services is equipped with an automated call-counting device, he added.

Asked to comment on the suit, Pacific Bell's local attorney Bart Kimball rejected Skystar's allegations as "without merit."

"We've tried to resolve this dispute with the phone company every way we know how and have gotten absolutely nowhere at all with them," Brown said.

Skystar rivals Sable Communications, Inc. and Omniphone Corp. have reportedly suffered virtually the same hardships as Skystar. They also disputed Pacific Bell's call-counting results and are pursuing their claims in state court, Kimball said.

VAX option converts text

From page 41

change revisable documents with systems on an IBM Distributed Office System (Disoss) network, using a Vax-to-Disoss gateway provided by DEC or a third party, Jaiswal said.

Du Pont Co.'s nuclear production facility for the U.S. Department of Energy has installed Vaxpak to provide editable document exchange among a variety of word processing systems based on IBM PCs, Macintoshes and DEC terminals. The company plans to expand the system's support to include the Wang Professional Computer, Wang Office Information Systems, Wordstar, Multimate and Wordperfect formats.

Vaxpak, available now, ranges in price from $4,000 for an average DEC Microvax configuration to $15,000 for a VAX 8800. The price includes support of two word processing formats. Support for additional word processing formats costs $2,000 per program for the Microvax and $6,000 per program for the VAX 8800.

Companies with dedicated word processors can participate in the Vaxpak network through an IBM PC-based gateway equipped with Keyword 7000. An existing hardware and software product, Keyword 7000 converts disk formats used by a variety of dedicated word processors. It costs between $5,000 and $9,000, depending on the number of disk drives supported, Jaiswal said.

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The promise of CIM systems

From page 41

of manufacturing systems, would have customers believe that the best CIM solutions occur in one-vendor shops. And it remains true that proprietary connectivity solutions have far more functionality than most multivendor offerings. For example, IBM recently announced its Engineering-Manufacturing Interface, which enables design bill-of-materials data to be extracted and then used in manufacturing and production bills of material.

IBM also offers Consolidated Design File, a relational data base management system based on the company's SQL or DB2, and Data Communications Service, a program providing data exchange between data bases on different systems.

"We think these products help break design-production barriers due to paper and procedures," notes Leonard Eisenberg, an IBM spokesman from the Information Systems Group in the Industrial Sector.

These solutions do not, however, address what Eisenberg describes as the "ultimate CIM goal in computerized process planning," which involves passing data down from the facility and shop administrative levels to the cell and workstation process control level — an area that is far less dominated by IBM (see chart). That issue is being addressed by a growing number of vendors that have entered joint development agreements to link their respective manufacturing systems.

For example, Allen-Bradley Co. is busy linking its own cell controllers with Data General Corp. and Stratus Computer, Inc. hosts. And DEC's Autofact exhibit included a demonstration of various VAX hosts monitoring and controlling equipment from Allen-Bradley, General Electric Co. and Gould, Inc.

It should be noted, however, that the above alliances involve vendors whose product lines do not overlap. Still conspicuously absent are high-level protocols that allow users to mix and match equipment on various levels of the manufacturing process.

Most vendors in the manufacturing sector have at least paid lip service to MAP as the future multivendor connectivity standard.

Unfortunately, products that can communicate through MAP have been slow to emerge, and MAP-based multivendor networks are still in the prototype stage. Some observers claim that MAP will not come into its own until the finalization of MAP Version 3.0 — which is approximately a year away.

The good news is that companies need not wait for a full set of connectivity products before implementing CIM. The trick is to target a few key application areas that can benefit from CIM implementation rather than go for a companywide, all-levels CIM project.

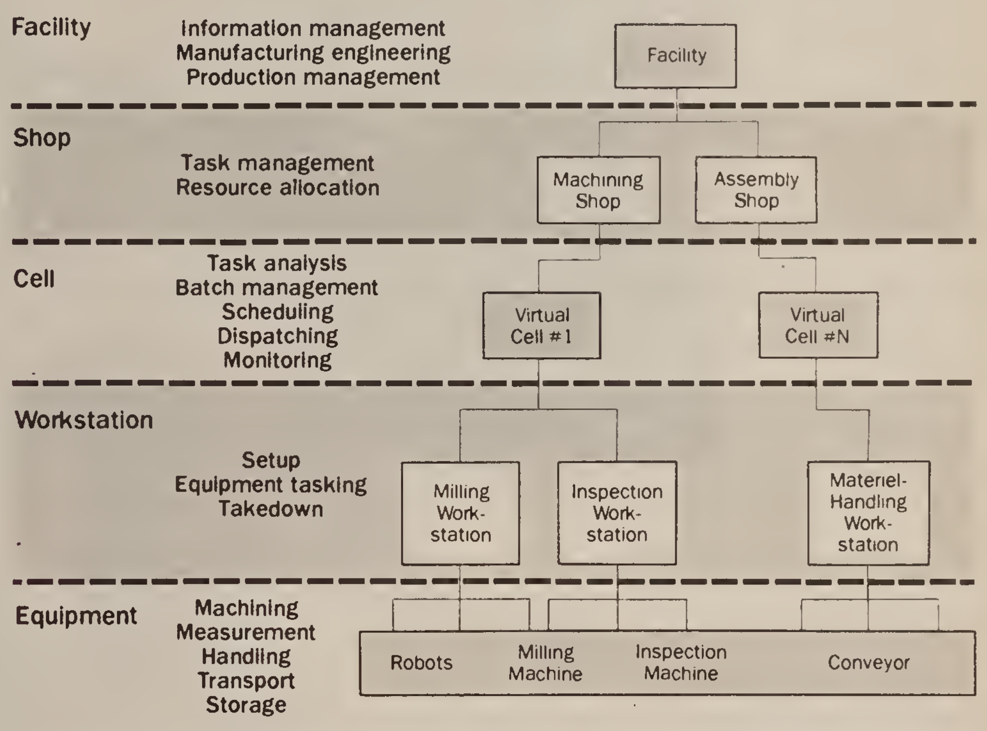
The advantages of tackling CIM piecemeal are manifold. From a strategic point of view, it is easier to sell upper management on a finite project with a well-defined payback period than on a much more ambitious project that makes vague promises of great returns over the long term.

And on a practical note, it is far easier to find commercial multivendor connectivity products for a CIM system that applies to a finite segment of the manufacturing environment and involves connecting a limited number of vendors' systems.

Companies that expect to find their connectivity solutions packaged and ready to go will be disappointed; but there are some useful software tools and partial solutions that can significantly cut down on the amount of code a company's programmers will have to write to link incompatible factory systems.

Data hierarchy

CIM and MAP connect automated work areas from top to bottom



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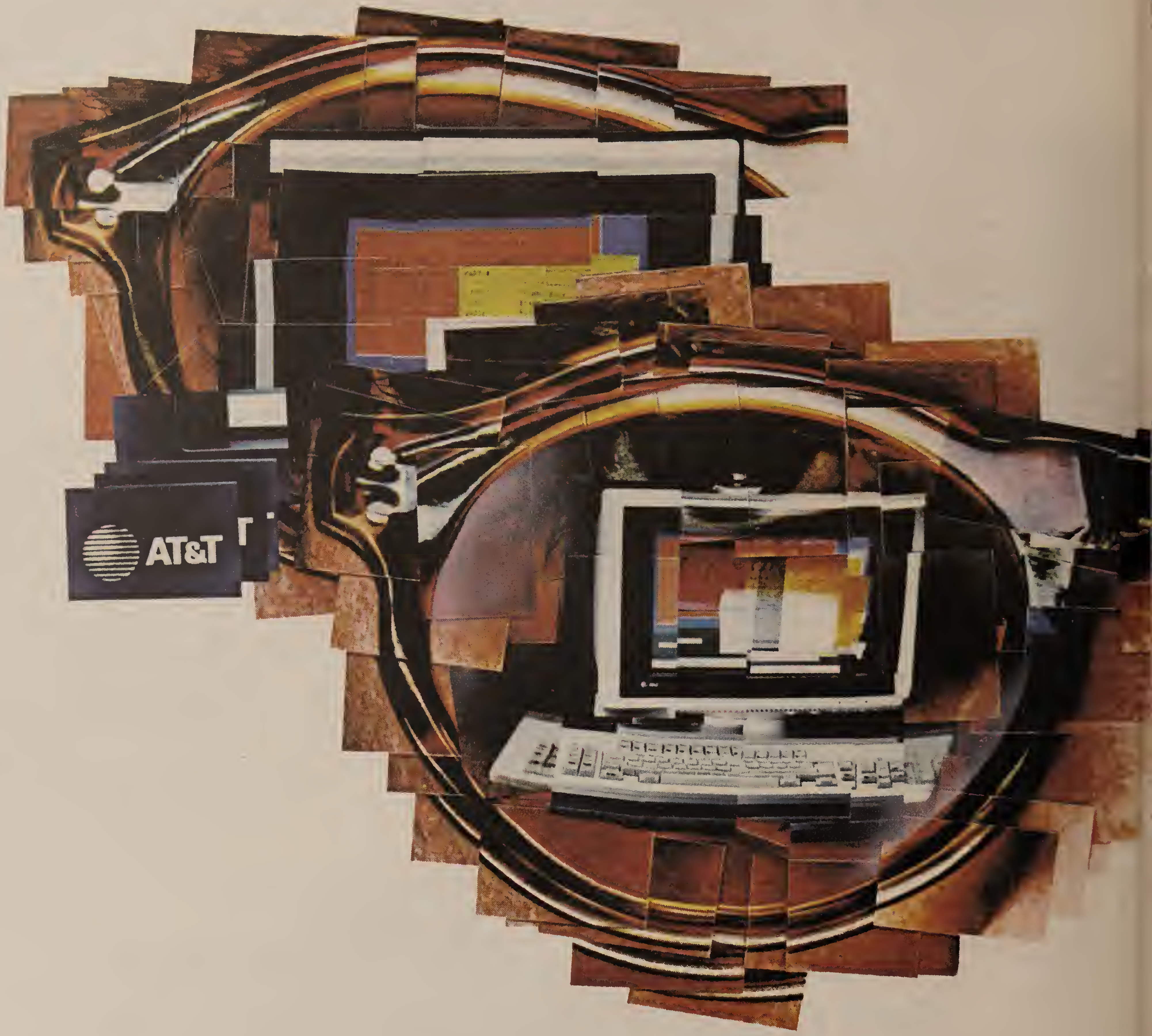

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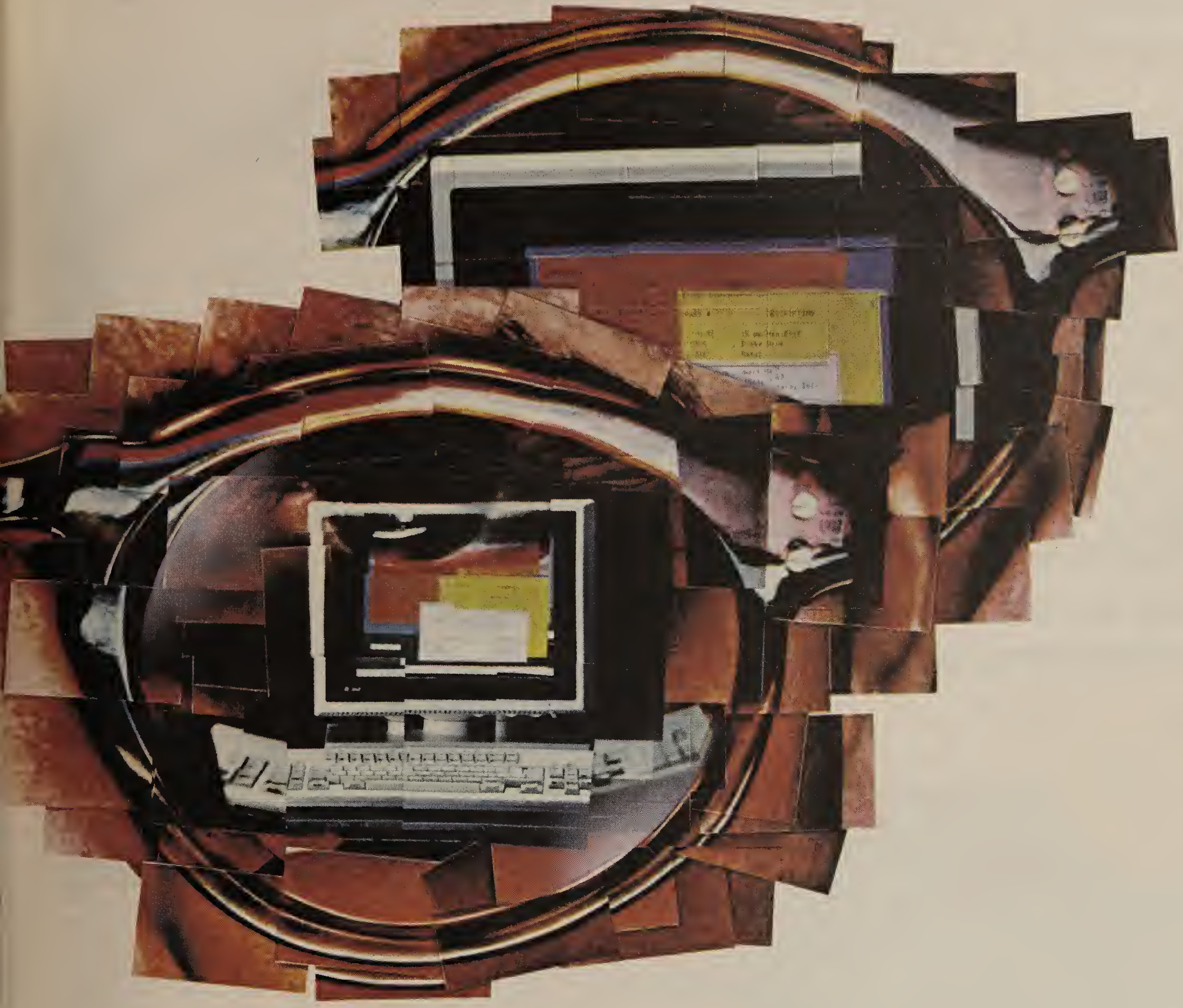

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IBM net exec talks open SNA

From page 41

international groups such as the Corporation for Open Systems (COS) as proof of IBM's commitment to communications standards such as Open Systems Interconnect.

"IBM's goal remains 'any-to-any' data connectivity regardless of the equipment, protocol or connection technology being used," she maintained. "That's because our customers are telling us that they need more than hierarchical communication. They want communication peer-to-peer. They want it among their workstations and mid-range computers."

IBM is relying on its Enhanced Connectivity Facilities to link its Personal Computers to the 370 architecture, Hancock said. Introduced in June 1986, these facilities reside on both the mainframe and the PC and make it easier to move data around the network, she noted.

"The user doesn't know what's going on at a low level in the host, but the major components — called routers, requesters and servers — are acting like messengers, running errands to manage communications between the PC and the mainframe," Hancock said.

The new IBM communications chief noted that IBM intends to support three distinctly different local-area networks: IBM's PC Network, the Token-Ring and a Token Bus industrial network based on the Manufacturing Automation Protocol (MAP).

The latter two networks are part of the OSI standard.

IBM, which is offering two MAP-compatible Series/1 programs — an applications server and a communications server — recently codeveloped an interface adapater with Industrial Networking, Inc. The device enables MAP users to attach IBM products to the network. "It makes it much easier to integrate IBM equipment with robots and the like out on the plant floor," Hancock said.

Hancock painted a picture in which OSI and SNA can "coexist in harmony," with OSI supplementing the "richness" of SNA functionality. "The IBM Network Packet-Switching Interface helps SNA products interface with an X.25 packet-switching network," she added. X.25 is part of the OSI network-level protocols.

A number of IBM products, including the 370, System/36, Series/1 and 3174 controllers, currently support the first three layers of OSI, Hancock pointed out. Token-Ring implements OSI protocols for the first two layers, she added.

Through its two-year ownership of Rolm, IBM is also enhancing its position in voice communications, Hancock noted. She pointed to Rolm's Juniper card, which fully integrates an IBM PC with an attached telephone; a phone mail voice messaging system, which ties into IBM's Professional Office System under VM; and Netview PC, which makes the Rolm computerized branch exchange part of SNA network management.

"We're working with Rolm development to extend [PC View's] reach," she said, declining to elaborate on further plans to integrate voice/data communications.

Westinghouse MAP net out

By Elisabeth Horwitt

DETROIT — At the recent Autofact '86 show here, Westinghouse Electric Corp. unveiled an optical-fiber broadband network that conforms to the Manufacturing Automation Protocol (MAP), the emerging factory communications standard. The product is likely to be the first commercial optical-fiber implementation of MAP if it is released next year on schedule, according to officials at the Westinghouse Research and Development Center in Pittsburgh.

The product will enable any "critical segment of an existing MAP network to be replaced with optical fiber at minimal cost," resulting in major improvements in uptime, said Francis Thompson, manager of the Research and Development Center's Electronics Technology Division.

The Westinghouse fiber-optic network can be linked to any 10M bit/sec. MAP equipment, the firm said.

Vitalink bridges expand abilities

From page 41

side of the bridge and responds as a cluster controller to the host's polling on the other side of the network, so that the polling process need not take place across the wide-area link.

Translink enables the 802 WAN connection to handle CCITT X.25 packet switching, IBM Systems Network Architecture host-to-host traffic and International Standards Organization High-Level Data Link Control protocols supported by Hewlett-Packard Co., Unisys Corp. and other computer vendors.

Translink and TransSDLC can act as statistical multiplexers, dynamically allocating bandwidth to connect active terminals and systems, the company said. Both products are available now, and each costs $12,500. Future Translan introductions will reportedly support the 802.5 token-ring standard and the 802.4 token-bus standard for factory communications.

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Edited by Janet Fiderio and Kelly Shea

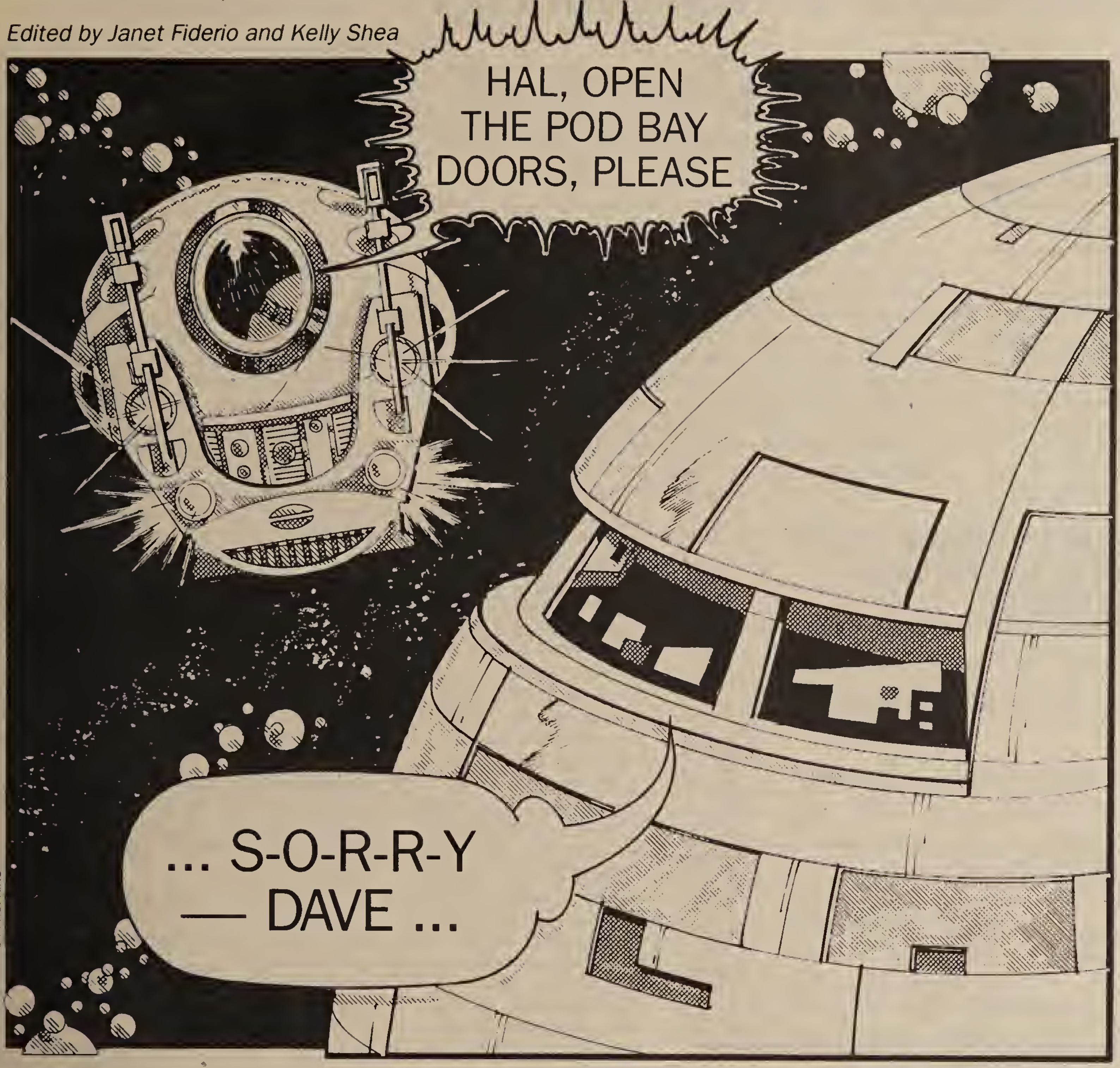
HAL, OPEN THE POD BAY DOORS, PLEASE
... S-O-R-R-Y — DAVE ...

ILLUSTRATION BY ALAN HOPKINS

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Voice synthesis helps keep handicapped broker up to data/58

Natural language

Sci-fi technology finds real-life applications

By IRENE FUERST

Over his morning coffee, Leonard Gross at AFD Industries, Inc. types into his computer keyboard, "Show me the inventory in 'BA' sorted by item." With this sentence, or any of a number of sentence variations, his system provides a full status report on a warehouse in Baltimore.

Gross is a user of natural language technology, which aims to make computers easier to use by replacing awkward computerese with simple typed English commands. It took a total of four weeks to train his system — this was accomplished by entering warehouse locations, customer names and item numbers, then supplying words and phrases fitting AFD's application requirements.

Although natural language's links to its cousins — voice recognition and speech synthesis — and to artificial intelligence might conjure up images of "2001: A Space Odyssey," the technology is no longer so futuristic that it is totally out of reach. The question for MIS, therefore, is not whether natural language will play a role in years to come, but whether natural language products are practical enough to warrant a closer look today.

Fuerst is a free-lance writer based in San Francisco.

cal enough to warrant a closer look today.

The answer is that, while this nascent technology is far from perfected, there are applications in which its use has paid off. With patience and the right application, current products can relieve common user anxieties, provide easy-to-use microcomputer or mainframe data base interfaces, free the hands of employees in hands-busy, eyes-busy occupations or provide invaluable help to the handicapped. And because natural language interfaces are also being integrated into general software products, MIS can expect to see the influence of the technology grow (see story page 48).

It is, after all, the issue of meeting the needs of non-computer-literate users that dogs the MIS/DP manager. "MIS wants something that will help them with their most serious problem — answering user requests," explains consultant Susan Messenheimer at AIM Publications, Inc. in Natick, Mass., which publishes the "AI Markets" newsletter. Natural language products, in theory, should take the burden of data retrieval off MIS's shoulders and place it on those of the end user.

> ***From the user's perspective, especially a micro user's, a natural language interface is an ease-of-use product. It does not have to be perfect, it just has to make computing easier.***

Most commercial natural language products serve as front ends to data base management

Real-life applications for sci-fi technology

Continued from previous page

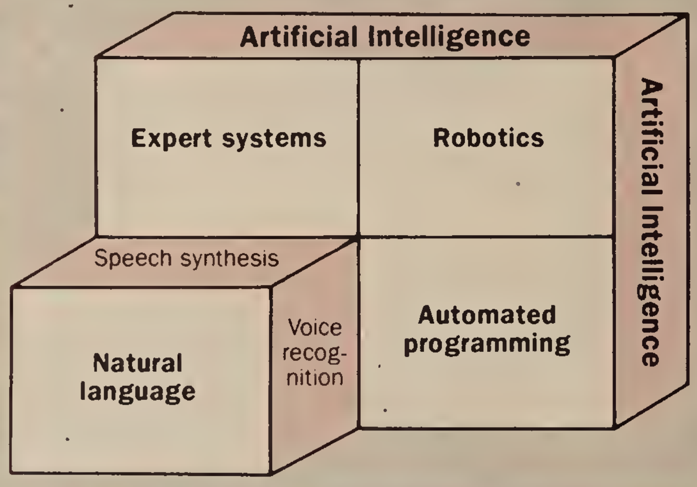
systems. Some are wedded to a particular DBMS, such as Martin Marietta Data Systems, Inc.'s English, a front end for the company's mainframe Ramis II DBMS. (English and Ramis II were recently sold to On-Line Software International, Inc.) Clout is a similar product from Redmond, Wash.-based Microrim, Inc., although it is designed for Microrim's R:Base, a micro-based relational DBMS. Others are linked to general-purpose query languages such as IBM's SQL or QUEL.

A few products, such as Language Craft from Carnegie Group, Inc. in Pittsburgh, are designed as tool kits for creating a customized natural language system that can be applied to a data base, an expert system or an operating system or command shell.

Natural language processors are also finding their way into user interface products such as Lotus Development Corp.'s Human Access Language (HAL). Although not really a natural language product — it does not serve as a front end to a DBMS or perform information retrieval — HAL can understand phrases such as, "Graph January to March." Thus, while HAL helps seasoned Lotus 1-2-3 users become more proficient with the package, it cannot let a novice use natural language to drive the spreadsheet.

Even with this variety of commercial activity, AI purists argue that true natural language products are not available. Within the stringent confines of the academic research community, a true natural language system is defined as one to which anyone can pose any free-form question. The question does not have to be grammatically correct, as long as other people can grasp the meaning.

NATURAL LANGUAGE: ONE BRANCH OF ARTIFICIAL INTELLIGENCE



Once the system is constrained in any way, questions must be predefined, and "You have to read a 300- or 400-page manual to understand which forms are acceptable," claims Henry Eric Firdman, an AI consultant based in Lexington, Mass. "It's a very big practical difference."

"A natural language product that would answer a question just as a person would is not here now and is not just around the corner," adds Ben Barker, senior vice-president for corporate development at Cambridge, Mass.-based Bolt Beranek & Newman, Inc. Most users, however, apply real-world rather than ivory-tower criteria to their purchasing decisions. From the user's perspective — especially a micro user's — a natural language interface is an ease-of-use product. It does not have to be perfect, it just has to make computing easier.

NATURAL LANGUAGE DEFINED

Traditionally, natural language access involves a user typing simple English commands into a computer keyboard. In an ideal natural language system, the user need not know computerese or complex programming languages — the system would respond to anything that a human could understand. The technology includes voice recognition and speech synthesis.

And that is really all that Joe O'Donnell wants for his users. "I think that most PCs are being used ineffectively. One of the stumbling blocks is that most of the applications are still too complex and cumbersome," says O'Donnell, a voice recognition and natural language consultant for Du Pont's polymer products department in Wilmington, Del.

"Ultimately," he says, "I want a PC-based system in which I could actually talk to the machine in natural language and get real answers. The next generation of computing will combine voice recognition, natural language processing and expert systems."

O'Donnell oversees a user community of about 75 executive and clerical employees. In addition to his natural language projects, he is currently working on accessing micro applications through voice recognition.

He is developing a system, an intelligent assistant of sorts, in which an executive talks to his PC, and it responds by providing prompts to different programs. "We have one particular executive who says, 'Good morning,' and the PC gives him prompts to access his electronic mail," O'Donnell explains. However, he is careful to point out, "I'm not talking about any kind of voice typewriter. The executive still has to type his notes into his electronic mail system."

O'Donnell turned to voice recognition to assist members of his department who cannot type very well. The Kurzweil Voicewriter, a voice recognition system with a vocabulary of about 1,000 words from Waltham, Mass.-based Kurzweil Applied Intelligence, Inc., is the system with which he has worked the most; it is PC-based.

O'Donnell's department's IBM Personal Computer ATs, when used as terminal emulators, are part of Du Pont's electronic mail system. "Most people are not proficient typists. Voice recognition overcomes that stumbling block — you get from point A to point B a lot quicker. It's a more natural way of communicating," he says.

Du Pont's efforts with voice recognition are still restricted, by and large, to opening and scrolling through electronic mail. For example, user Bob McKay turns on his terminal at the start of the day and says, "Good morning, open my mail." The system promptly displays the first of his electronic letters; with further voice commands, it will display the rest of his incoming correspondence. McKay spent one hour training his phrase-driven voice recognition system to understand a 350-word vocabulary. The system has a 98% reliability rate.

Although McKay's application is more typical, one of O'Donnell's executive users controls about 75% of his micro's programs by voice.

Du Pont's voice recogition project is unique in that nearly all of the commercial applications so far for the products are found in niche markets such as quality assurance on a factory floor or inventory.

O'Donnell's work with natural language processing goes back five years, with two applications currently in his department. One is a financial application, the other is a customer sales history — both are installed in an IBM VM-based mainframe environment. O'Donnell's department was a beta site for Artificial Intelligence Corp.'s Intellect, the first commercial natural language product. Intellect is available as a front end to many mainframe DBMS query languages.

O'Donnell says Intellect is closer to a fifth-generation language; he considers fourth-generation languages complex, cumbersome and difficult. "The most natural way of querying a data base is asking an English question," he says. "That's what the future holds."

Intellect has proven extremely successful at Du Pont. O'Donnell tells of an occasion when a salesman called him up for training on the customer data base, which has Intellect as a front end. Instead of bringing the

Continued on page 50

Experts' Opinion

Refining product, defining market will carve niche

By CAROL WEISZMANN and SUSAN MESSENHEIMER

In principle, natural language interfaces allow end users who speak no computerese to perform ad hoc queries of corporate data bases without tying up the MIS staff. These interfaces, therefore, hold huge promise. Why then, after 10 years of commercial development, hasn't the demand for these products soared?

AIM Publications, Inc. research shows that although the market's 1985 revenues topped $11 million, growing almost 100% compared with 1984 figures, growth in 1986 is expected to increase only 20% compared with 1985 revenues.

Are we in fact witnessing a dying market? Contrary to appearances, the answer is a resounding No. But to understand this optimism, you must first acknowledge both the hurdles natural language vendors must overcome and recent market advances.

Currently, the market faces the following three stiff challenges:

- Natural language technology is still comparatively primitive. Studies show that only about 70% of all natural language data base queries are satisfactory.
- Most natural language interface vendors struggle to define their customer base. Vendors are often undecided on who to sell to — should an interface for use on high-end systems, mostly mainframes, be sold to the MIS director or to the decision maker in corporate operating departments?
- Vendors of personal computer-based natural language interfaces developed products as data base management system add-ons — but with different command structures. They did not realize that those who build PC-based data bases using data base management system packages are also the ones who retrieve data from the DBMS. Since these users are already familiar with the DBMS command structures, they have no incentive to learn new natural language commands.

That's the bad news. Fortunately, there is good news, too, and it signals a rich era for natural language interfaces.

- Some new natural language products are being designed with menus. This approach first surfaced commercially with the introduction of McDonnell Douglas Computer Systems Co.'s Natural Language offering

See Weiszmann on page 50

Weiszmann and Messenheimer are principals in AIM Publications, Inc., a Natick, Mass.-based market research firm specializing in artificial intelligence commercialization. AIM publishes the monthly "AI Markets" newsletter.

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NATURAL LANGUAGE INTERFACE PLAYERS IN

Vendor	Product	Hardware Required	Price
Stand-Alone Natural Language Building Tools			
Artificial Intelligence Corp.	Intellect	IBM mainframes and DEC VAX, VMS	$6,500-$75,000
Brodie Associates	Language Workbench	IBM Personal Computer and compatibles	$895
Carnegie Group, Inc.	Language Craft	DEC Vaxstation, Texas Instruments Explorer, Symbolics 3600	$25,000
Frey Associates, Inc.	Themis	DEC VAX	$12,000-$25,000
Intelligent Business Systems, Inc.	Easytalk	DEC Microvax II, VAX	$65,000-$80,000
McDonnell Douglas Computer Systems Co.	Natural Language	McDonnell Douglas minicomputers	$2,000
Texas Instruments, Inc.	Natural Link	IBM PC and compatibles, TI Professional Computer	$1,500
Optional Integrated Natural Language Interfaces			
Lotus Development Corp.	HAL (works w/Lotus 1-2-3)	IBM PC and compatibles	$150
Martin Marietta Data Systems	English* (works w/Ramis II*)	IBM mainframes	$13,500-$27,000
Micro Data Base Systems, Inc.	K-Chat (works w/Knowledgeman-2)	IBM PC and compatibles	$295
Microrim, Inc.	Clout (works w/R:Base)	IBM PC and compatibles	$249
Integrated Natural Language Interfaces			
Javelin Software Corp.	Javelin (spreadsheet/data base management system)	IBM PC and compatibles	$695**
Micro Data Base Systems	Guru (spreadsheet/DBMS/expert system tool)	IBM PC and compatibles	$6,500
Safeguard Business Systems	SBS Accounts Receivable (accounting software)	IBM PC and compatibles	$595
Savvy Corp.	Savvy Database (DBMS)	IBM PC and compatibles	$237
Symantec Corp.	Q&A Intelligent Assistant (DBMS/word processing)	IBM PC and compatibles	$299

* These products were recently acquired by On-Line Software International, Inc.

** Javelin is being sold for a limited time (10.000 copies' worth) for $99.

Information provided by AIM Publications, Inc.

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for its minis.

One complaint of early users of natural language interfaces was that they were faced with a blank screen; nothing in the interface helped structure user queries. A menu structure to direct queries keeps users in the English subset and assures that queries remain within the semantic and pragmatic bounds of the system.

• The recent debut of Human Access Language (HAL), a natural language interface add-on to Lotus 1-2-3 offered by Lotus Development Corp., is significant if for no other reason than that Lotus is the premiere microcomputer software supplier and 1-2-3 boasts an enormous base of customers that HAL can tap. As such, HAL should give the natural language interface market a needed boost in growth and legitimacy.

More notably, HAL does not piggyback on a DBMS and does not perform information retrieval; rather, it helps 1-2-3 users become more proficient. This issue carries several implications. Because 1-2-3 is more limited in its language demands than a data base, HAL will likely be a more successful and useful implementation of a natural language interface than many of the current offerings tied to DBMSs. This in turn will attract other vendors to develop natural language interfaces for other software products as well as woo users to buy them.

The upshot of all this is that a whole new sector of the natural language interface market is yawning open — one that will effectively bring natural language interfaces to a personal computer software market ripe with opportunity.

• Also portending a sanguine future for the natural language interface market is the emergence in the last year of interfaces that are integrated into other software products.

This growth cannot be ignored. The $320,000 in revenue from software offerings with integrated natural language interfaces that vendors garnered in 1985 as these products hit the streets will leap to more than $35 million by the end of this year.

Right now, these integrated offerings exist only for personal computers. Note, however, that interfaces running on high-end systems have been developed by such stand-alone tool vendors as Artificial Intelligence Corp. and Frey Associates, Inc., specifically for DBMS products sold by Cullinet Software, Inc., Information Builders, Inc., IBM and Oracle Corp. By 1988 there will be genuinely integrated natural language interfaces available with software designed to run on high-end systems.

> ”
>
> ***One complaint of early users of natural language interfaces was that they were faced with a blank screen.***

While this sector will get a late start, it, too, will enjoy strong growth as vendors understand the value of helping their MIS customers satisfy corporate end users' needs with natural language interfaces that handle several types of tasks. The interfaces will allow human-language-based access to computer-held data that is common today and will also help employees become proficient users of software and end-user programming — notably in expert system knowledge engineering.

Integrated natural language interfaces can be expected to find their way into such high-end-based software products as DBMSs, decision support systems, financial applications software, manufacturing resource planning systems and expert systems tools and applications.

These developments — menu-driven interfaces, the pioneering of Lotus's HAL and the arrival of integrated natural language interfaces — will have an immediate effect on the traditional interface market.

Indeed, two vendors of offerings with integrated interfaces — Intellisource, Inc., which sells accounting software, and Direct Aid, Inc., which offers an on-line data base — built their interfaces with Texas Instruments, Inc.'s Natural Link.

It is probably no accident that some of the first to use these tools to generate commercially available products offer integrated interfaces, for the real future for natural language interfaces lies in their integration into other software products.

Today's MIS function is struggling under a backlog that keeps building as end users seek more and better access to strategically critical information. A significant portion of the MIS burden could be lifted with the implementation of natural language interfaces. As these interfaces improve, so will the prospects for their marketplace. AIM Publications forecasts that by 1990, more than 450,000 software packages will be shipped with integrated natural language interfaces. ■

Continued from page 48

employee to headquarters, O'Donnell simply sent him a manual, with surprising results. "Two months later I realized I hadn't heard from him. When I finally met him, he said, 'I'm fine, I'm using it.' That's the benefit of a natural language application — it's very simple to use, and that's basically what we designed it for. If I get one call every month I'm lucky."

Not all commercial natural language projects generate similar success stories. Why? According to BBN's Barker, "A large part of the problem is installation — tailoring the system to the customer's technology. How to put the data together to answer a question is really quite different from customer to customer. It is really not a thing you can build once; it has to be significantly tailored and tuned." Consequently, he says, "The systems effort is as key a success issue as anything. That's a hard thing for a new corporation to get a handle on."

Finding the right customer may become an additional problem for the natural language pioneer — there are some computer users who just have little or no need for the technology.

Paul Harris, financial systems consultant with the bond and corporate finance department of John Hancock Insurance Co. in Boston, set up Intellect and the Kurzweil Voicewriter on PC ATs accessing an IBM 3033 mainframe. In the six months to a year that Harris has been experimenting with the system, however, the natural language technology has not paid off, he says.

The end users Harris supports are investment officers — largely senior officers in the bank — who do not type, so the Kurzweil/Intellect system would theoretically allow them to speak their commands instead of typing. But, Harris says, "in actual fact, high-level people who don't type very well have support staff; they ask to have it done." He adds that these would-be end users are not especially patient, either. They no more want to learn how to use a voice recognition system than they want to learn how to type.

Harris points out there is more to getting a response from Intellect than just asking a question and says these users are not sophisticated enough with computers to know the right questions to ask. Although Intellect may be able to help frame a question, he explains, "When end users talk with someone who knows the data well, they can clarify what they want more quickly.

"Users often leave a lot of things out. They may say, 'Show me what we've got in such-and-such account.' I'll say, 'That account's got an awful lot of deals in it — do you want just the deals we've done recently?' " Posing an incomplete question to a natural language system might result in a lot of unnecessary information, Harris says.

He agrees that the ultimate user of a natural language product has to take a lot more responsibility for understanding the data, but this is a responsibility that is often unwelcome. The corporate officers want complicated reports, Harris says, and it is easier for them to let the experts take care of the details. "They are not complaining about us not giving them the reports they need. There is not a lot of pressure to get at the data directly," Harris adds.

In addition, he explains, for the members of his staff situated between the end users and the data, "It's just as easy to use Focus [a fourth-generation language from Information Builders, Inc.] as to use Intellect. The kind of report you can do with Intellect you can do with Focus."

Harris concedes that Intellect's natural language capabilities make it an attractive product for some people. But, he says, forming a request in English is unnecessary once you get used to Focus's quasi-English.

Ultimately, Harris concludes, Intellect's English-language interface has given him much less in terms of problem solving or productivity than going from a third-generation language like Cobol to a fourth-generation language.

> ***The question is not whether natural language will play a role in years to come, but whether natural language products warrant a closer look today.***

In addition to front-end products like Intellect, natural language technology has also been incorporated into more generalized software systems.

Some users, especially those in small companies, have opted for turnkey systems, in which the technology is fully integrated into several applications in order to dispense with the services of a professional programmer.

AFD Industries' Gross is one such user. Gross, vice-president of finance for the Montvale, N.J.-based elevator parts distributor, uses Easytalk — an AI program built on top of a business package that is designed to access the data base of the business software with English-language commands — a product from Intelligent Business Systems in New Haven, Conn.

Another Easytalk user is Nicholas Niejelow, president of Optima, Inc., an importer and distributor of eyewear in Stratford, Conn. Built around a Digital Equipment Corp. Microvax II, Easytalk is composed of an entire business system, including inventory control, accounting, graphics, word processing and spreadsheet software.

Easytalk monitors the inventory in AFD's 13 warehouses, including tracking particular parts, the total available to sell, the orders that have come in and incoming stock.

"It's a great tool for executives who don't know much about computing," says Gross, who explains one of the reasons he installed the product was so the company's executive staff would be able to ask a question in English. "They don't need any computer training except to turn the computer on."

Gross claims to know a little about computing but says he's neither familiar with the file structure nor able to write sophisticated programs.

Despite this, AFD managers do their own programming in Easytalk, circumventing outside programmers.

"We have written more programs on our own than were given to us to start with," Gross says. "We have saved a lot of money. We have written about 25 programs on our own."

Optima's Niejelow concurs: "It eliminates another body that I had to pay $40,000 or $50,000 a year."

Microcomputer data bases are by nature smaller, simpler and cheaper than VAX or mainframe data bases; hence users have lower expectations and do not demand as much from them. They tend to view natural language interfaces on PCs in much the same way; they are often installed for less-than-critical applications designed for casual use.

Sam Costa, a research services programmer at the Princeton University computing center, recommended

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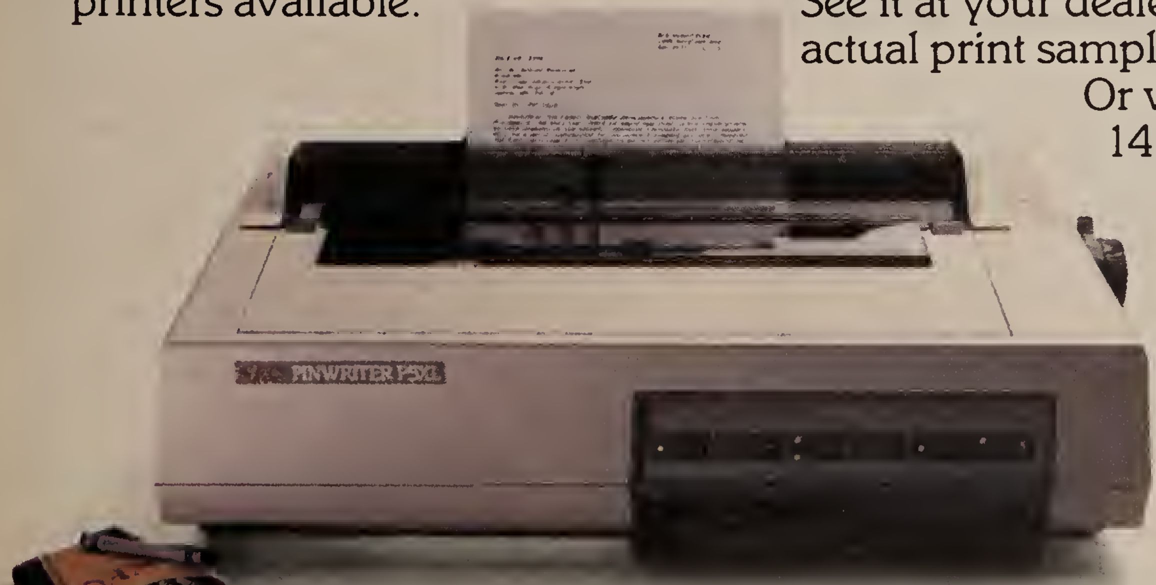

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Continued from page 51

Microrim's R:Base and Clout for universitywide personal computer — mostly IBM PC XT and AT — users after completing an evaluation project of several micro DBMSs, including Ashton-Tate's Dbase III Plus and Software Solutions, Inc.'s Dataease.

Clout is an optional English-language front end for R:Base, a system that Costa set up and now supports. While not yet widely used throughout the campus, several deans' offices are exploring the system's capabilities for managing information pertaining to students and faculty members.

"The biggest advantage of Clout is the way you can build up your synonyms. People like to ask questions using terms they can understand. It has a fairly simple way of defining synonyms," Costa says. "Clout is best for its ad hoc queries. You don't have to worry about what was that column name or the exact syntax.

"An oversimplification would be that it's a synonym file, although it's more than that as far as the user is concerned," Costa says. The appearance of natural language means more to users than whether the program conforms to an academic definition, he says. "If it makes them feel more comfortable, they're going to explore it more."

Eric Fernald, manager of human resources consulting for Price Waterhouse & Co. in Los Angeles, installed Clout for users of an executive recruiting data base, which "is a combination of all the candidates we have interviewed or who applied 'over the transom,' " Fernald says, and contains approximately 4,500 records. About seven people use the data base for ad hoc queries at least three or four times a day, he says. One Compaq Computer Corp. Deskpro 286 PC houses the system; the selected users are provided a password to access the data base.

"Executive recruiters want to have little to do with the inner workings of the software," he says. With Clout, the users do not have to know the design of the data base, what a "join" is or in what file or field an item is located.

"For our purposes we can do very sophisticated queries," Fernald says. For example, he can ask, "How many candidates are controllers and live in Los Angeles and have a salary of $65,000 to $100,000, how many of

Continued on page 56

Voice recognition systems speak to office applications

Expanded vocabulary, continuous speech key

By JOSH BRACKETT

Getting computers to talk has been relatively easy when compared with getting computers to listen, and the reasons are simply stated:

- No two people speak the same way, even those from the same dialect group.
- Our speech tends to be continuous, meaning it is not broken into discrete words but bubbles out in phrases and sentences.
- We do not always enunciate speech sounds the same way every time; the sounds change with the context. For example, "don't" plus "you" can become "don't chew" or "don'tcha."

Current voice recognition systems are successful in situations in which isolated words and small vocabularies are appropriate, such as in on-site inventory control or product inspection conducted by employees whose hands are busy, but the hottest product research is in the area of continuous speech.

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> ***The hottest voice recognition product research is in the area of continuous speech. Clearly, vendors see the corporate office and voice dictation as prime targets.***

Clearly, vendors see the corporate office and voice dictation as prime targets for voice recognition products.

Jim Baker, chairman and chief executive officer of Dragon Systems, Inc., a Newton, Mass.-based voice products vendor, says, "Long term, we're all aiming at the same goal. Everybody wants to do unlimited-vocabulary, continuous speech recognition with close to zero error rates." But in the meantime, Baker says, vendors are having to compromise "either on vocabulary, on the naturalness of language, on isolated vs. continuous or else on error rate or some combination of those."

Three companies that have multiyear commitments toward meeting the goal of a large-vocabulary continuous speech system that can take real-time dictation are Dragon Systems, Speech Systems, Inc. of Tarzana, Calif., as well as IBM's Watson Research Center in Yorktown,

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Brackett is a free-lance writer based in Rockport, Mass.

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Speech Systems claims to have a product available now; Dragon Systems expects to have it in 1987. And IBM, as usual, is hesitant to discuss product plans.

Such systems go far beyond template matching to phonemes and syntax recognition, attempting to analyze speech sounds more or less the way humans do.

To learn a language, man or machine must learn to do more than just recognize phonemes — the basic sound contrasts of a language that make one spoken word different from another — wherever and however they appear. They have to recognize where one word ends and another begins, which requires knowledge of syntax and semantics.

IBM has demonstrated a 5,000-word vocabulary system that runs on a souped-up IBM Personal Computer AT and takes real-time isolated-word dictation. A new user has to enroll by reading a 1,000-word script that gives the system a sample of his speech.

Robert Mercer, a research staff assistant who conducts speech recognition research at IBM's Watson Research Center, and his colleagues are working on extending the system's vocabulary to 20,000 words, which he says will reduce the rate of misrecognized and unrecognized words to an acceptable 2%.

According to Mercer, recognizing continuous speech takes 15 to 20 times as much computing power with three to seven times as many errors. He predicts that in the end, hardware advances will provide the power.

"The real problem with continuous speech is that we, at least, don't know how to get the error rate down, no matter how much time we spend doing the computing," Mercer explains. "There is real algorithmic research that needs to be done to make continuous speech work."

In an effort to lead the pack in continuous speech product development, Speech Systems, at Comdex/Fall '86, introduced the DS100, a development version of its Phonetic Engine.

The DS100 promises, according to the vendor, "true, natural speech input to computer-based equipment, allowing continuous speech — with no required or unnatural pauses — and large vocabularies — up to 20,000 words."

The product comes with the PE100 Phonetic Engine and development software packaged in an Intel Corp. 80286-based 310 microcomputer to which Speech Systems adds its own multibus board. The system is intended for use by developers who want to create applications for the PE200, an end-user Phonetic Engine that is scheduled to be shipped next spring.

The DS100 package costs $52,000 and includes a generic speaker model that permits use with no enrollment for small-vocabulary applications but requires some enrollment to tune it up for large-vocabulary recognition. The PE200 will cost $5,000.

Whereas Speech Systems has jumped over the use of isolated words and attacked the problem of continuous speech directly, Dragon Systems has focused on the specific problem of creating a personal computer-based system that will take dictation.

Because of the hardware limitations it has set for itself, Dragon has also had to require its users to isolate words to some extent.

According to Baker, to recognize a vocabulary of about 200 words spoken in isolation is a job that an IBM Personal Computer can handle. If you increase the vocabulary to 1,000 words, you need not only more memory but more computing power: a PC AT.

But to handle that same vocabulary in continuous speech would require the equivalent of about eight ATs because of the ambiguity problem inherent in continuous speech. For example, the machine might question: Is this the end of a word? What word? To go from 1,000 words to 10,000 will require about twice as much power, or the equivalent of 16 ATs, and more memory as well.

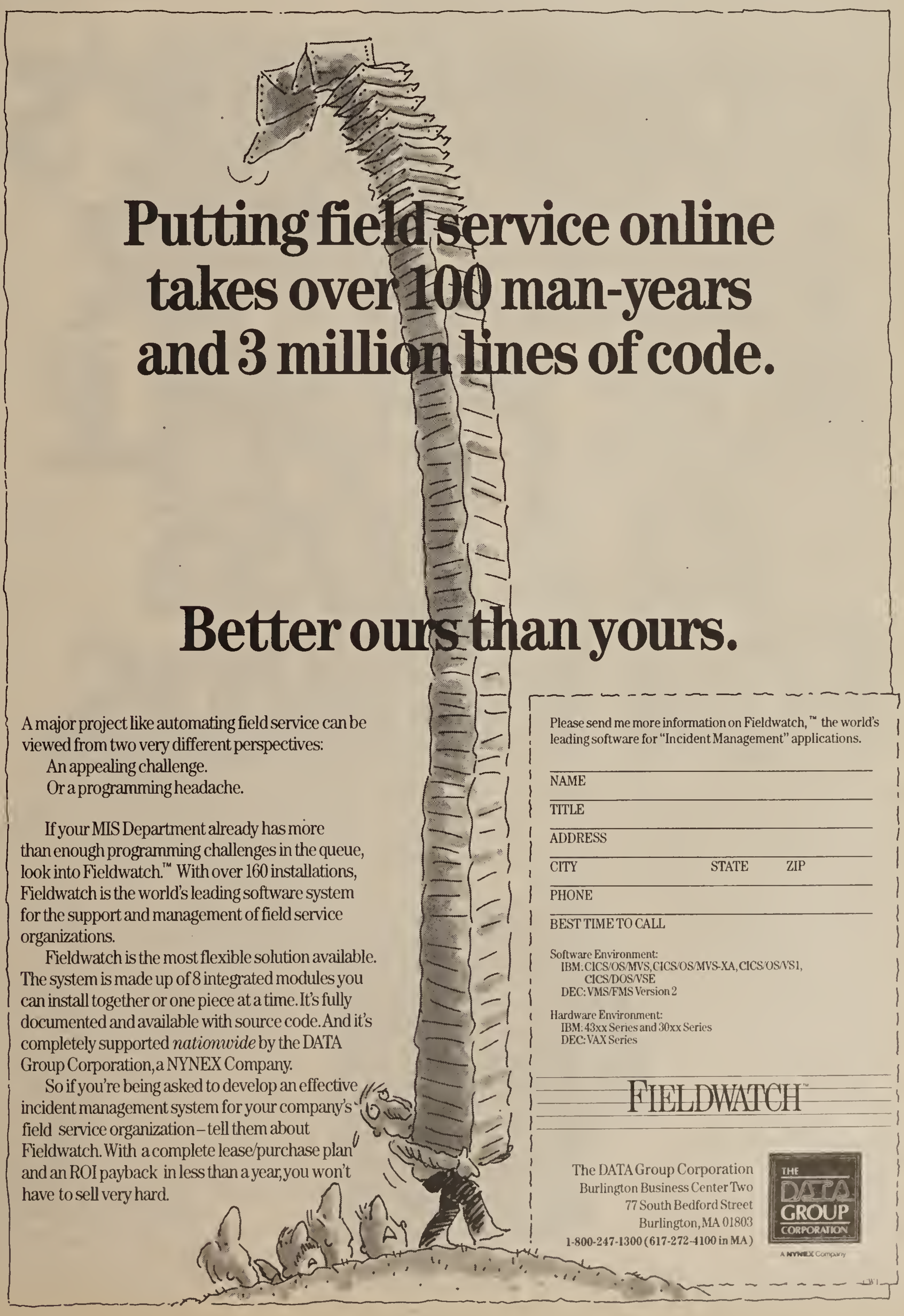
Dragon currently markets the Voicescribe 1000 — a 1,000-word-vocabulary, speaker-dependent, isolated-word peripheral board that plugs into the PC AT and compatibles — for $995.

Next year, Dragon plans to market the Voicescribe 20000, a 20,000-word-vocabulary system for high-end Intel 80386-based microcomputers that will recognize isolated words at first and later, with more power and memory, continuous speech. ■

MITCHELL J. HAYES

VOICE RECOGNITION

Voice recognition allows users to communicate with computers through spoken commands. Most products require each user to "train" the system to recognize his voice and work best with a limited vocabulary and discrete pronunciation — the user has to pause before and after each word. Current research focuses on the area of continuous speech recognition systems.



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Continued from page 54

these are in the entertainment industry, and how many of these are Price Waterhouse alumni?''

Although Clout will ask users to define words it does not know and ask for data field names, the purists' question of whether Clout or similar products are really natural language processors is irrelevant, Fernald says. ''I think it's English; I've never had any problem with it.''

Another PC-based natural language offering is Q&A — a micro DBMS with a built-in natural language interface from Symantec Corp. in Cupertino, Calif. Tony Reeves, a consultant in the information resources center of Hughes Aircraft Co.'s electro-optical group in El Segundo, Calif., says, ''I usually suggest Q&A when there's a manager involved who doesn't have a lot of computer background. Managers usually want something that's easy.'' He estimates that anywhere from 100 to 400 people — mostly in management — use the product on PC XTs at Hughes.

'Easytalk is great for execs— they don't need any training except to turn it on.'

— Leonard Gross
AFD Industries, Inc.

Reeves recognizes that a basic product like Q&A has its shortcomings. ''It's fairly limited in the complexity of the queries you can make,'' he says. ''It's funny. You can see the cursor go along until it gets to a word it doesn't understand.'' Then it sits there for a while — which can be as long as four or five minutes, Reeves says — and ''thinks'' about it.

''It handles queries like, What is our production quota for a particular item?'' he says. ''But it can't handle complex questions that involve several searches of different data bases.'' As a result, Q&A is reserved largely for administrative data bases; the company's engineers use products such as Microrim's R:Base and Ashton-Tate's Dbase. ''For managers, Q&A comes in real handy,'' but ''it's not that much of a power product; Dbase and R:Base offer that,'' Reeves says.

Other users are downright skeptical about the practical applications of natural language technology. W. N. Burdick, manager of the computer systems group for William Blair & Co., an investment banker in Chicago, uses the Knowledgeman DBMS from Micro Data Base Systems, Inc. and its associated expert system product, Guru, for his company's PCs — IBM XTs and ATs.

Guru includes an English-language interface called K-Chat, also from Micro Data Base Systems, but Burdick reports he has turned it on only a couple of times. ''I really don't use natural language yet because I don't see a business purpose for it.

''You're substituting a lot of typing for learning some short commands. I don't use computers to solve simple problems,'' he says. For Burdick, natural language is a gimmick. ''It's like touchscreens,'' he says. ''Why would you want to put your greasy hands on the screen?''

Gimmick or not, natural language products have been commercially available for some five years. ''There was a lot of hype about natural language in 1982 and 1983. There were some companies who predicted a billion-dollar interface market by this time. Now we're in a transition period,'' AI consultant Firdman says.

The upshot is that natural language projects in commercial development are relatively cool now. Natural langauge was advertised widely as a tool for people with no expertise in computers to get answers to their questions, Firdman says, but ''sometimes they can't get any answers.''

''Up till now it has been a marketplace that hasn't seen much action at all. It certainly hasn't generated much income,'' AIM Publications' Messenheimer agrees. Even so, she is surprised at the level of interest natural language generates, ''considering the small number of products on the market.''

Messenheimer predicts that the market will start to move, probably in late 1987, in large part because of favorable changes in current natural language interface design and integration.

What is feasible, say both Firdman and Barker, are products oriented toward specific applications — in other words, special-purpose instead of general-purpose natural language processors. They are also being integrated into expert systems, a branch of artificial intelligence that has more market appeal.

Vendors are trying a number of strategies to attract customers. Only a few of them have made much of

Continued on page 60

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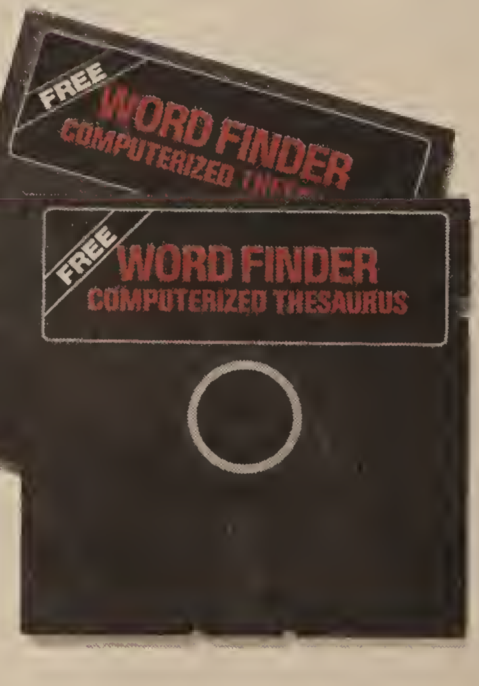

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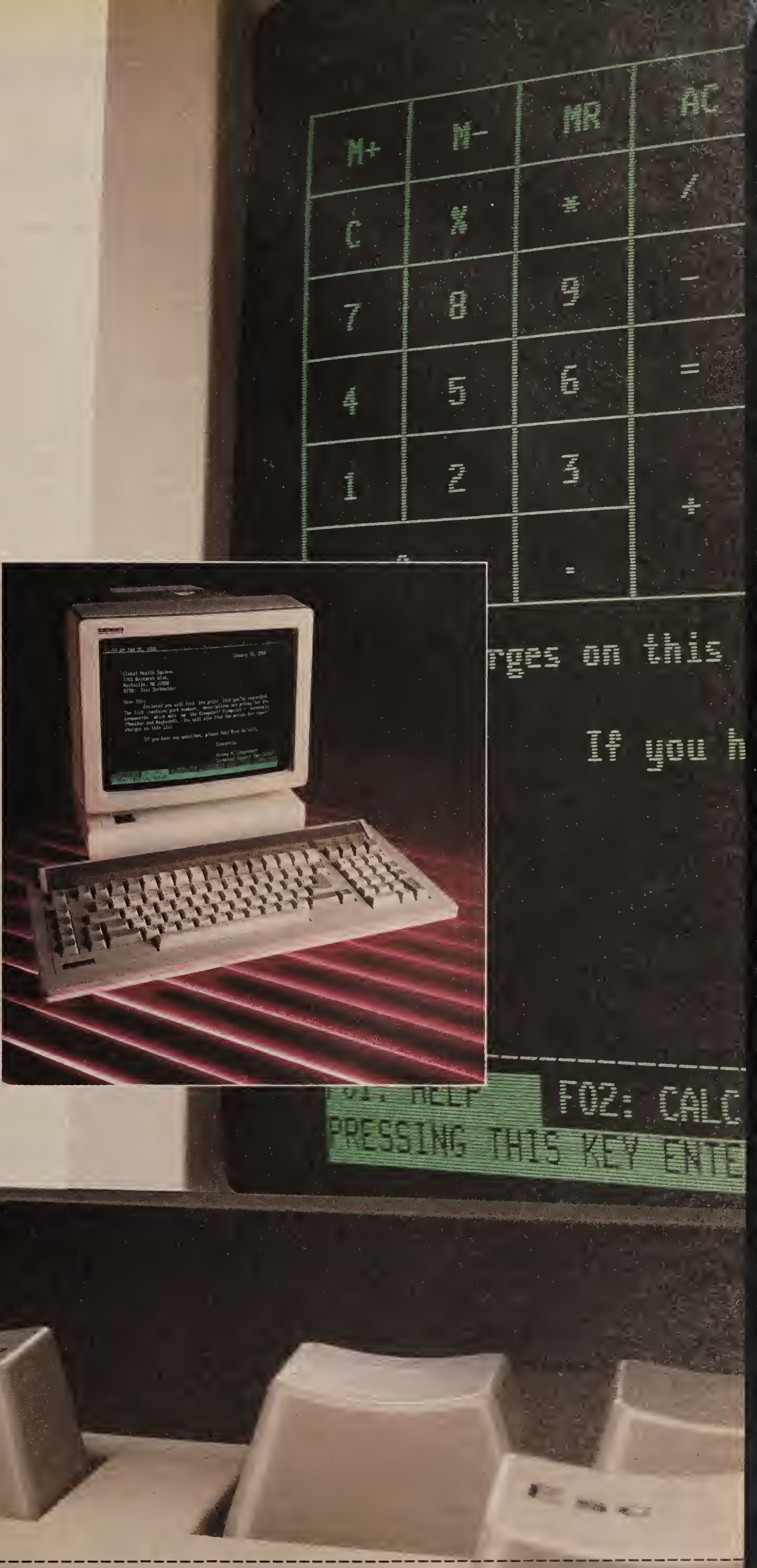

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Speech system boosts stockbroker's, newspaper's efficiency

By MICHAEL SULLIVAN-TRAINOR

User Profiles

Speech synthesis technology represents the difference between self-sufficiency and dependency for Chris Harvey, a blind stockbroker with Wheat, First Securities, Inc. in Bethesda, Md.

"There's very little that I cannot do myself because of my synthetic speech system. It's quite an investment in equipment, but it enables me to compete effectively with other brokers," Harvey says.

Personal computers with the capability to provide speech output are also allowing the *Dallas Times Herald* to use its customer service personnel more effectively to increase circulation.

"The system will pay for itself tenfold by saving time and allowing our people to delve into other types of work," says Mike Zgraggen, assistant circulation systems manager.

While accessing computers through natural language is preferable for most applications, computers that can talk back are being profitably employed by many users who have unique requirements.

The above examples represent the wide range of users who have implemented speech synthesis applications to support both handicapped and nonhandicapped users.

In most cases, the technology is being used to replace human labor, provide tools for the handicapped or offer attention-grabbing capabilities, according to a study conducted by International Resource Development, Inc., a Norwalk, Conn.-based technology consulting company.

Revenues for vendors of speech synthesis systems are projected to total $265 million next year and increase to about $1.5 billion by 1995, according to the market research firm.

Although these systems have some drawbacks, such as a high price, users like Harvey find that they can become a vital part of business operations.

"There are 14 brokers in this office, and I'm the third leading producer this year. A large part of that is due to my computer system. The alternative would be to have someone read the information to me, but this is quicker and more reliable," he says.

For nearly four years, Harvey, 27, has depended on a system called Information Thru Speech (ITS), developed by MCS, Inc. of Forest Hills, Md. ITS consists of a Hewlett-Packard Co. HP 125 personal computer with a speech synthesizer. Harvey's system includes a Winchester disk, providing 1.2M bytes of storage, and a letter-quality printer.

Until recently, Harvey did all his work on the ITS, using it to access off-premises mainframes through a modem and to run software packages.

Now, his assistant uses the ITS system for local applications such as word processing while Harvey uses a newly acquired Total Talk terminal, also from MCS. The terminal provides the same speech synthesis capability as ITS but does not have the capability to run software applications.

Through his modem, Harvey can access a mainframe at the New York Stock Exchange to hear about action on the stock market, obtain quotes on various stocks and tap into the Dow Jones News/Retrieval service.

He can also switch modes on the modem and access a mainframe data base at Wheat's Richmond, Va., office, where data on his clients is stored. Financial planning and correspondence applications are also available on software that he uses with the ITS system.

Most of the data Harvey receives is in the form of a symbol for a specific stock and numbers quoting the price. He runs the speech synthesizer, which has a range of 45 to 720 words per minute, at about 300 words per minute. Programmed with more than 400 rules of standard English pronunciation, Harvey can adjust the system to alter the pronunciation of certain words.

"The speech is very robotic, more masculine than feminine. Some synthesizers are better, some are worse. This is a medium-level system. I've been listening to it for almost four years, so to me it's second nature. It's just like anybody else's voice in this office. I understand the machine better than I do some people.

"I lost my sight when I was 20 years old in a shooting accident. Because I was once sighted, I can still picture a lot of things in my mind. So when this machine is verbalizing numbers, I'm picturing that screen. The voice simply creates an image in my mind so quickly that I'm not really even paying attention to the quality of the voice," Harvey says.

One problem Harvey has encountered with the system is the lack of

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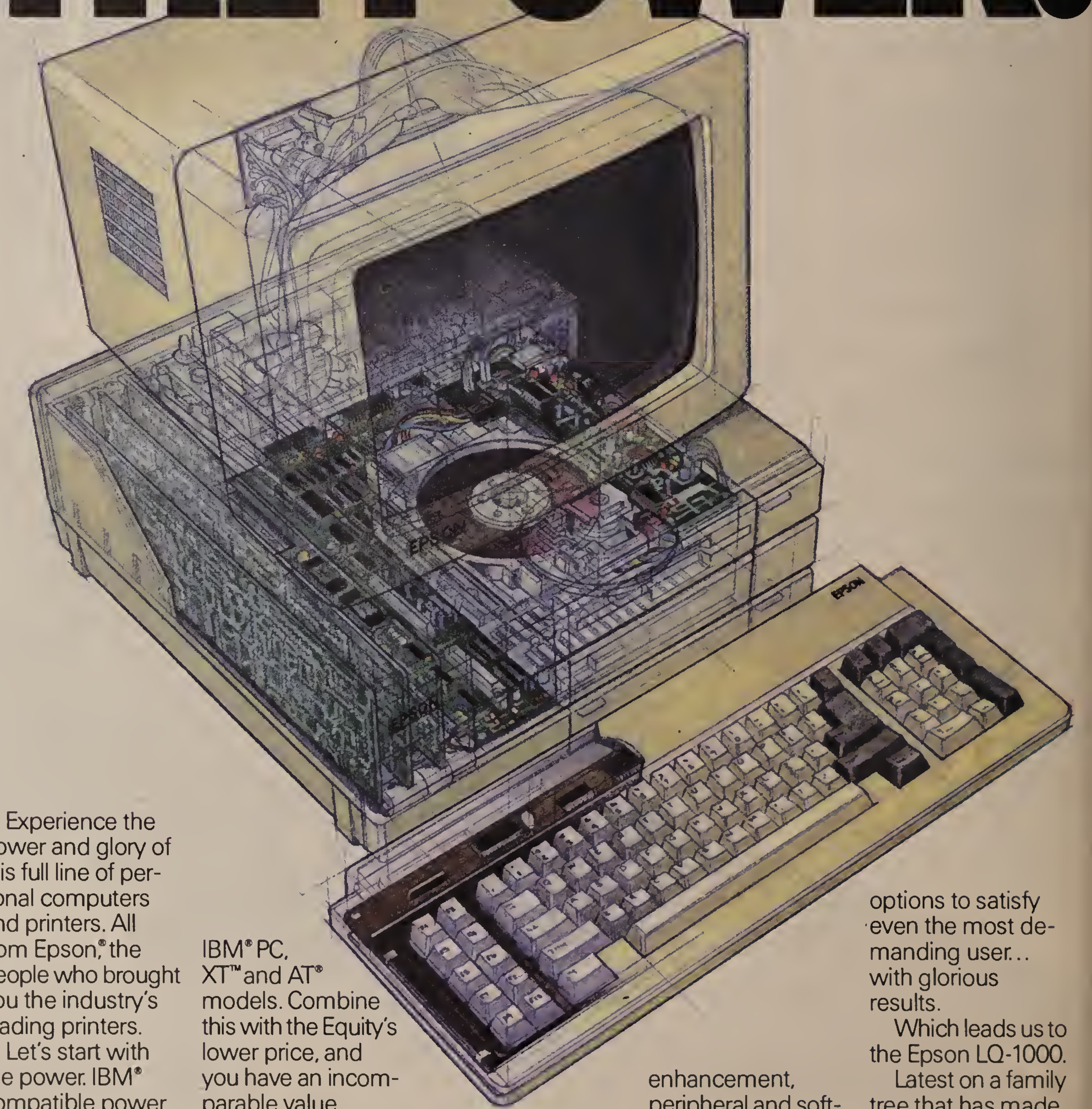
Sullivan-Trainor is a Computerworld *senior writer.*



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inexpensive software. For example, he had to purchase a costly word processing package, rather than one of the more popular packages on the market.

Other speech systems, such as those that operate with the IBM Personal Computer, allow users to work with more generic software.

Acquiring the hardware was also an expensive proposition. Harvey's system, including the additional terminal, required a personal investment of $17,300.

"The price is really what's impeding the progress a lot of blind people are making. When they find out that this type of system is available, their stumbling block is not having enough money to pay for it. There are certain research and development costs that make it hard for vendors to get the prices down, and when you're dealing with a population of around three million, tops, companies cannot afford to put a large amount of money into the development of these systems," Harvey says.

One hope for a reduction in the cost of speech synthesis technology is the broadening of applications beyond those for handicapped users.

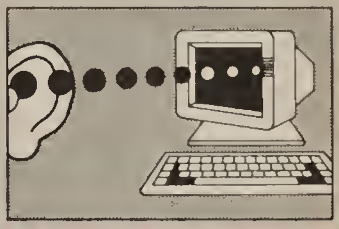
Bank account access systems and other customer service applications, such as the one used at the *Dallas Times Herald*, may make the market attractive enough for large companies to invest in the technology.

To lighten the work load of its customer service staff, the *Dallas Times Herald* is implementing two personal computer controllers with speech synthesis capability. The PC controllers are manufactured by Speech Plus, Inc. in Mountain View, Calif.

MITCHELL J. HAYES

SPEECH SYNTHESIS

Computers with speech synthesis capabilities can talk back to the user in artificial speech generated using phonemes — the smallest units of sound in human speech. More human-like speech can be produced with voice output systems, which digitize and store actual human speech and then use the stored information to reconstruct words or phrases.



Currently, the newspaper's customer service clerks answer telephone calls from customers registering complaints and input the information through terminals connected to a Hewlett-Packard HP 3000.

The complaints are stored on a data base that the clerks can access when they receive calls from dealers. The clerks then read the complaints over the phone to the dealers.

The Speech Plus system will take care of half of this operation. Instead of speaking with a human operator, a dealer will access the controller by keying in a code on his Touch-Tone telephone.

The controller will then access the section of the data base that applies to the dealer's circulation area, and the text will be interpreted into speech by the system.

"It's important for dealers to know about complaints, because our policy is that if customers call us, we guarantee redelivery," Zgraggen says.

Initially, the system was going to be installed to replace some of the customer service clerks, but now, because the circulation department has received additional projects, the system will make it possible to handle an increased work load with current staff.

> *'The system will pay for itself tenfold by saving time and allowing our people to delve into other types of work.'*
>
> — Mike Zgraggen
> *Dallas Times Herald*

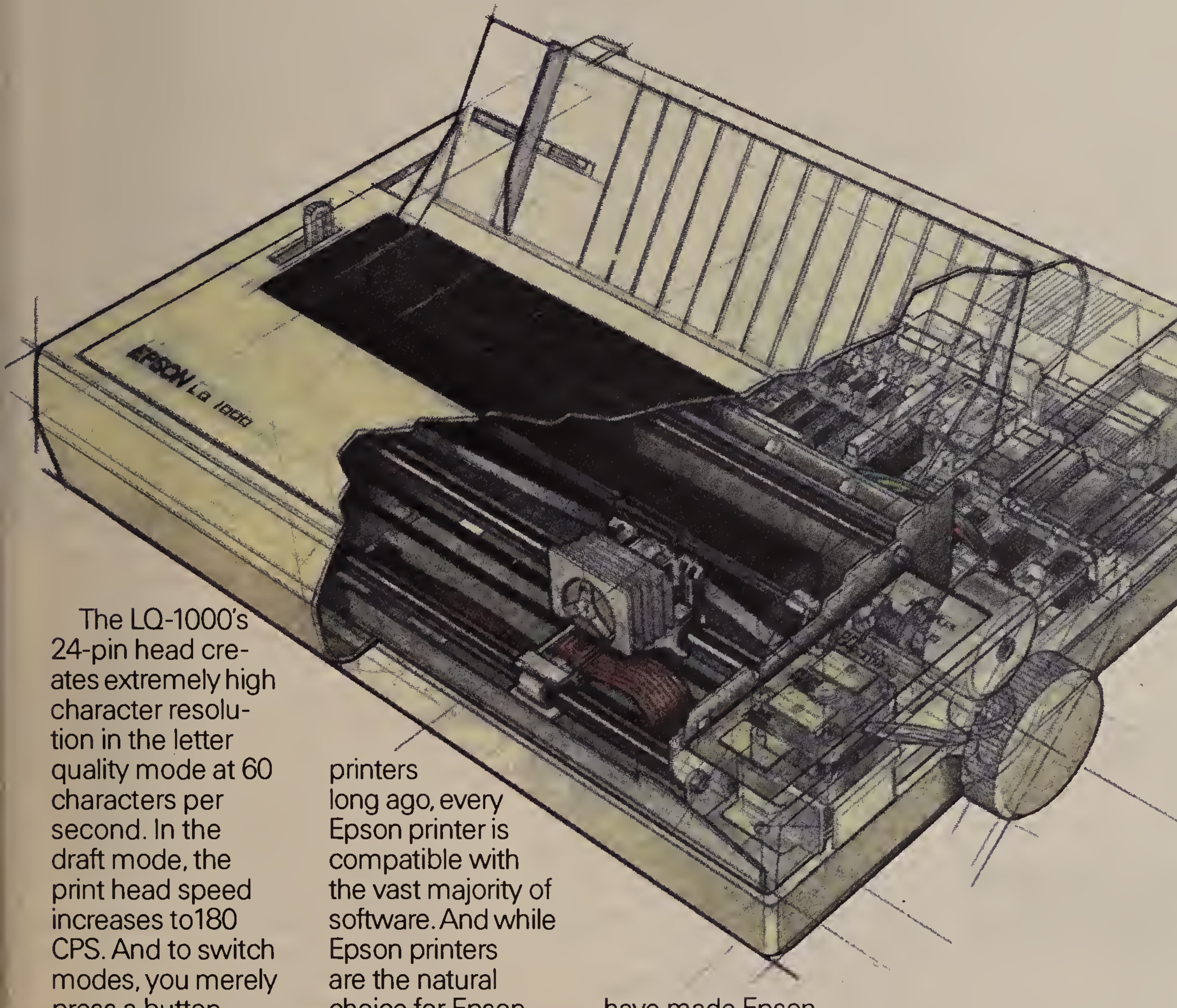
The department's most critical new project will require the customer service clerks to respond to weekly billing questions from the customers.

In addition, the newspaper plans to increase the number of customers who pay for their subscriptions in advance, which will also add to the work load.

"The ability of the customer service clerks to focus on these other projects without being interrupted by dealer calls is worth the approximately $70,000 investment the *Times Herald* made in the system," Zgraggen explains.

While most of the bugs in the installation have been ironed out, systems personnel are concerned about the new system draining the HP 3000's resources, because the Speech Plus software executes twice as many transactions to accomplish the same task as a human operator.

Although Zgraggen clearly does not want the speech system to drastically affect system response time, he claims, "We don't think it will." ■



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Continued from page 56

an impact. "It's an infant marketplace," Messenheimer says. "It's not clear that any one is the right solution."

Leading the pack is Artificial Intelligence's Intellect, the oldest natural language product, having been in commercial release since 1981. It was designed primarily for IBM data bases and fits well into many corporate MIS environments. Intellect is found in approximately 450 installations and is available for several IBM mainframe data base products — DEC VAX-based RDB/VMS, Focus and Teradata Corp.'s data base machines. Artificial Intelligence has marketing agreements with IBM, Cullinet Software, Inc. and DEC.

Challenging Intellect is Themis from Frey Associates, Inc. About two years old, Themis is a front end for a clutch of VAX DBMSs. Frey is currently trying to apply a distributed approach, however, taking natural language to the workstation — to the desktop PC user.

Taking a still different tack is Cognitive Systems, Inc. of New Haven, which develops special-purpose AI software and text-understanding systems rather than generic natural language products that attempt to be all things to all people. Cognitive also spun off Intelligent Business Systems, the vendor of Easytalk, the VAX-based turnkey business system.

One Cognitive project involves financial transactions that are sent by telex. The vocabulary of money transfers is fairly small, yet an arriving telex is manually transferred to a computer. Cognitive has developed Atrans, a program designed to replace the employee who reads the telex. Atrans is currently in use at several banks, including Citibank N.A. in New York.

Another class of natural language products that Cognitive is developing is consumer advisory systems. . These are designed to provide banking customers, for example, with information on account balances, loan or investment rates and so on. The systems would be a brand of automatic teller machine — but instead of pushing buttons in response to menus, the user can just type in a question. Consumer advisory systems can be applied to insurance or travel agencies as well.

Whatever the approach, there are a lot of problems to overcome. BBN's Barker explains that many commercial systems cannot distinguish among the subtleties of English; therefore they can give a wrong answer. An example is the question, "How much does Smith make an hour?"

It can mean two different things in different contexts: how much money Smith makes every hour or how many widgets he produces in that time. "People see the answer on the screen and they tend to believe it because the computer told them. It can be a dangerous thing. The range of knowledge that would have to be embedded in a hundred different contexts is beyond what a machine can handle today," Barker says. "The machines out there have to be set up for a specific domain."

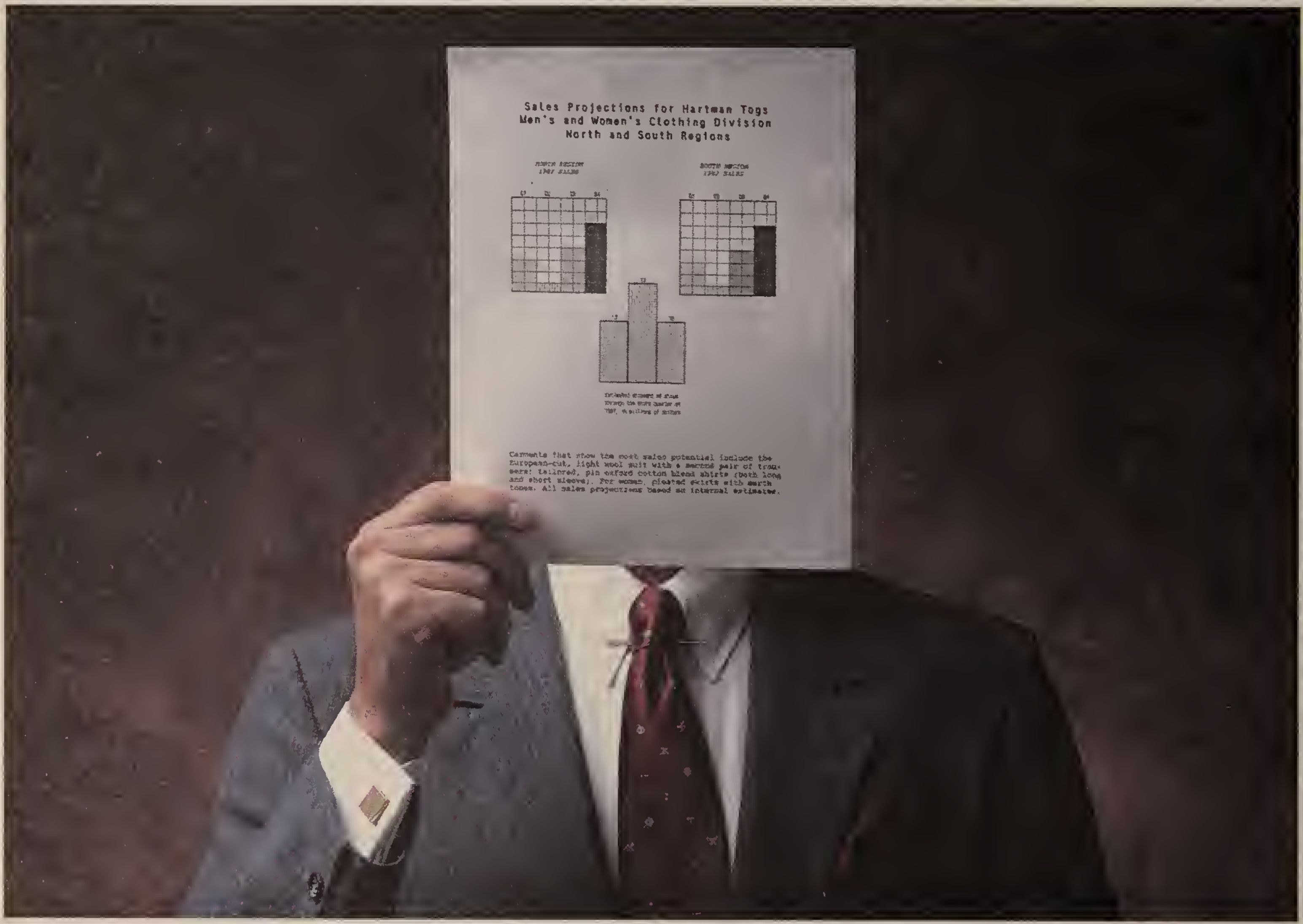
A similar concern presents a big hurdle to voice recognition development also — dealing with natural, as opposed to artificial or constrained, language. "Simply knowing what sense to make out of a string of syllables depends on knowing a lot about what you're talking about. There is no way to parse those phonemes into words," Barker says. An example is "new display"; it could also be "nudist play." Putting a break between the words helps, he says. Today's general-purpose systems require a pause of about one-eighth of a second between words.

> ***'A natural language product that would answer a question just as a person would is not here now and is not just around the corner.'***
>
> — Ben Barker
> Bolt Beranek
> & Newman, Inc.

Voice recognition systems are also hampered by only being able to recognize one speaker, who has to train the system. A product could be trained by two people, but then it would have only half the vocabulary. "My biggest reservation is the training aspect. It takes about half an hour for 300 words," John Hancock's Harris says. "When you're dealing with executive users — they're the ones who would really like voice, but they're the ones who are the least tolerant of sitting down for an hour and a half."

"The particular user of the system has to train the system to recognize that particular individual," Du Pont's O'Donnell agrees. "He has to say those words three times apiece. The first phase — of approximately 200 to 250 words — took approximately 45 minutes to one hour." O'Donnell's users have not complained about the training period, though, perhaps because it is divided into several sessions. He says they get their payback when they speak, and the machine responds. "That's when you realize the accomplishment.

"I think everybody's act has yet to come together," O'Donnell says. "I think it will in time. We are trying to put the pieces together in a fashion where we can see results." ■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Productivity tools betray promises of MIS nirvana

- *MIS managers dazzled by promise of faster programmers*
- *Most defects are introduced during specification, design phases*
- *Needed: error detection and prevention in the early stages of program life cycle*

ILLUSTRATION BY CHRIS DEMAREST

By GOPAL KAPUR

Programmer productivity is the new MIS mantra echoing through the hallowed halls of corporate America. Say the words, and MIS managers drop their forecasts of hardware needs, grab the maintenance backlog, turn to Armonk and chant, "Give me productivity or give me megamicros!"

The dream of these managers is to make programmers disappear. The DP industry can set its corporate clocks by the manual-thumping evangelists who regularly sweep across the country delivering seminars on the promises of a programmerless society. But if these promises do not materialize, then programmers are to be made more productive by writing code faster through code generators, fourth-generation languages and workbenches.

In spite of all the hyperbole, distress signals from the industry indicate it is still in trouble. Programmers are not producing quality software, projects are seldom on time, end users are not happy and most MIS managers are eagerly looking toward the light at the end of the tunnel — which is most likely a train coming at them.

Productivity placebos

In the mid-1970s, much-heralded solutions to the nagging problem of programmer productivity included structured methodology, chief programmer teams, HIPO (Heirarchical Input, Process, Output — some claim it really stands for How IBM Puts you On), top-down design and bottom-up development and sandwich testing.

When all of these tools failed to produce a noticeable increase in productivity, the next big promise was the advent of a programmerless society. The industry was flooded with self-proclaimed messiahs of productivity who promised salvation by predicting the demise of the programmer.

Amusing as these sound-and-light shows were, they sounded much like the visions of the operatorless computer rooms promised by the developers of operating systems. What these vendors did not mention was that mainframe operating systems would lead to the creation of an exorbitantly expensive employee — the systems programmer — while only minimally reducing the number of operators needed to run a DP facility. This brings to mind the riddle, "How many systems programmers does it take to change a light bulb?"

(None, it's a hardware problem.)

The 1980s brought us fourth-generation languages (or are we into 5GLs already?). The vendors of fourth-generation languages promised not only a programmerless society but one devoid of analysts as well. What a glorious vision.

These visionaries assured us we would need a slew of microcomputers; very powerful micros were recommended to achieve acceptable response times. Friendly users were also necessary. What vendors really hoped for were gullible users, also known as system-friendly users. Multicolor graphics packages were thrown in to make the

About the author
Kapur is president of Kapur & Associates, an information systems consultancy in Danville, Calif. The firm specializes in software rehabilitation and managerial effectiveness.

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output more attractive.

The era of designer bugs had begun.

The fourth-generation language vendors claim their languages are easy to learn and child's play to master. The obvious question here is, Why, then, are there so many four-day seminars for learning these supposedly simple languages? Within a very short time, many users realized that rather than benefiting from the promised productivity, they were witnessing cosmic chaos.

Chaos in the new technology

The latest solution being bandied about is the workbench ("Turbodesk" would have been fun). The promises of subsecond response time, word processing at programmers' fingertips and syntax checkers were only a few of the options available for a mere few thousand dollars per programmer.

The new MIS mini-mantra is, "A workbench on every programmer's desk." We are told that productivity will rise above all expectations because the workbench logs on, logs off, downloads, uploads, switches channels and checks syntax.

Why is it that we often confuse activity with productivity? The most curious part of workbench technology is that programs must still be tested on the mainframe, where the typical response time is seldom below 30 minutes (that is, if TSO is up).

It is disconcerting that workbench manufacturers have yet to understand the true problem with programmer productivity. When will these vendors offer tools that can truly help solve the problems of low productivity, and not give us another fast processor whose only claim to fame is that — be still, my heart — it does multiple windows?

All of this absurdity reminds me of an experience I had with a building contractor who had given me a proposal for building a house. He was extremely excited about a revolutionary product: a microwave fireplace.

"But why would I need a microwave fireplace?" I asked.

With beaming eyes and a broad smile he replied, "You can have a completely relaxing evening in just 15 minutes." I ordered two.

Defining the problem

Programmer productivity can be defined using the following criteria:

- Productivity is directly proportional to the number of correct and error-free functions delivered per unit of time.
- Productivity is inversely proportional to the number of programmer-introduced defects during program design, coding and debugging and testing.
- Productivity is directly proportional to the number of defects detected during program design, coding and debugging and testing.
- Productivity is directly proportional to the percentage of source code not written from scratch.

The basic problem with programmer productivity is that the proponents of the programmerless society and its tools define the productivity problem in terms of slowness in response time, code development, syntax checking, program compilation and testing.

About the only real hindrance to programmer productivity is lack of speed in testing. However, given the typical approach to program development, making the first two steps faster will only compound the problem by putting poorly defined, designed and tested programs into production more quickly — a case of reverse productivity.

> ”
>
> ***A substantial amount of conventional program testing time is spent on detecting and correcting predictable and easily avoidable errors resulting from incorrect and incomplete specifications, low-quality design and careless coding.***

The inordinate proportion of time devoted to testing does not imply that most of the software put into production is well tested. A substantial amount of conventional program testing time is spent on detecting and correcting predictable and easily avoidable errors resulting from incorrect and incomplete specifications, low-quality design and careless coding. All of this is further aggravated by a lack of good techniques for developing adequate test data.

The research and experience of Kapur & Associates show that low productivity is not due to slowness in writing code, checking syntax or compiling programs. Industry data shows that coding is only 14% to 18% of programming effort, whereas testing takes up to 40%. In addition, coding is responsible for only 25% of the defects in a program (see chart page 68, left), with most of the defects introduced during the specifications and design steps. So why the feverish activity directed toward having programmers code faster? Obviously, an increase in productivity is possible — not by improving the programmer's ability to write code faster but by instituting methods and produres to prevent and detect defects during the early stages of the program life cycle.

Any approach that allows defects to go undetected for any length of

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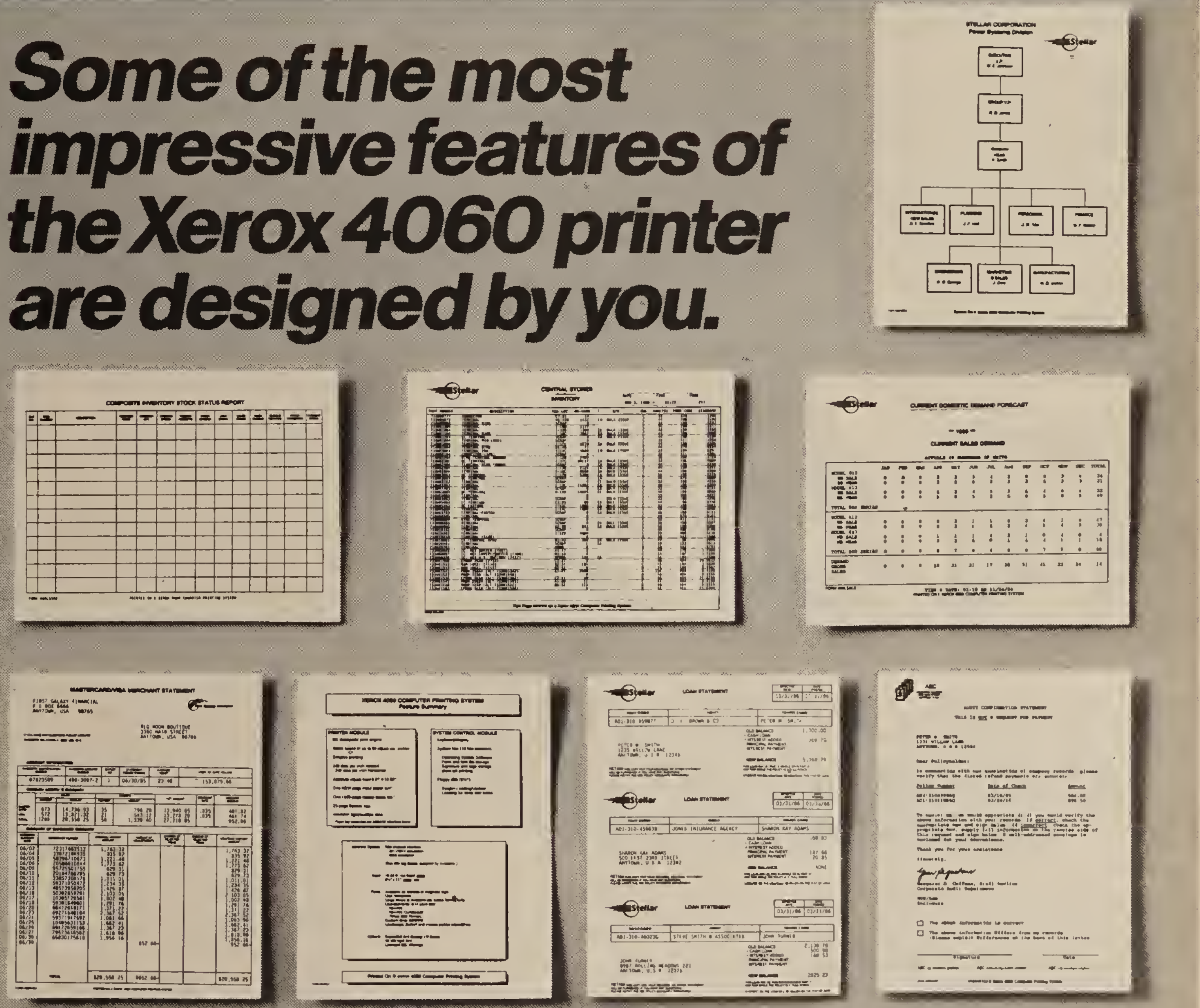
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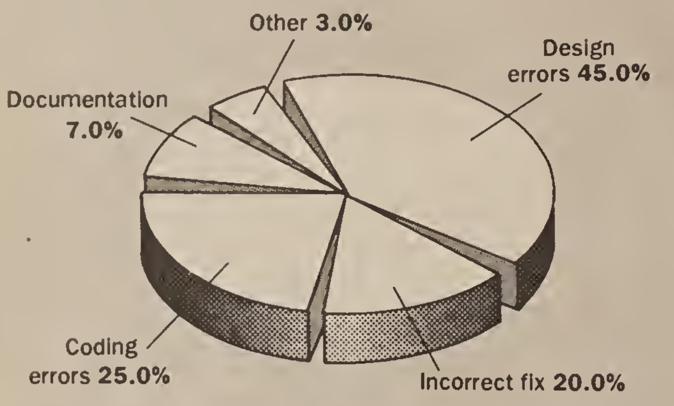
Sources of programming defects

Most defects — 75% — arise not during the coding phase of software development but during the design and analysis phases.



Information provided by Capers Jones

JEFF BABINEAU

time results in low productivity. In fact, any defect that goes undetected for more than one development phase begins to masquerade as a program feature and becomes very difficult to detect.

Program specifications

The main problem with conventional productivity tools is that they come into play very late in a program's life cycle, usually during coding time. In fact, if program specifications are wrong, a workbench or a fourth-generation language can facilitate quick implementation of incorrect solutions, although using fourth-generation languages to define and verify user needs can certainly help.

Program development typically goes through the following phases: specification, design, coding, testing and documentation.

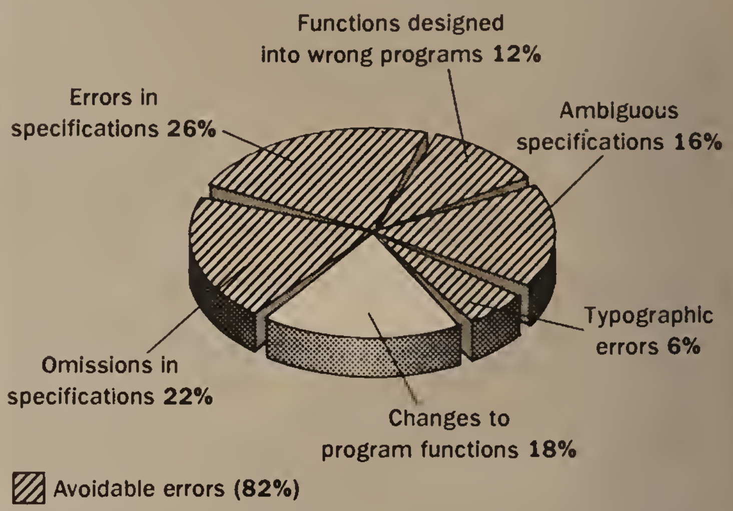
Virtually all programmer productivity methodologies except prototyping ignore program specification, the most important phase of program life cycle. This occurs despite the fact that this phase is the one in which the most productivity can be achieved with the least investment. For example, all structured programming and the majority of productivity proponents virtually skip the program specifications phase.

Three years ago, Kapur & Associates conducted a study to see what types of defects were due to poor specifications. We studied 68 program specifications from the time they were delivered to programmers until 12 months after the programs were put into production (a total of more than 18 months). All changes made to these programs during this time were recorded.

At the end of the study period, the changes were grouped into categories (see chart at right.). The figures indicate that 82% of the changes made were a result of avoidable errors in writing the specifications. Improving the specifications-writing methods would certainly have reduced the number of changes that had to be made to these programs. The chart on page 69 gives a set of design situations that can be used to assess the quality and completeness of the specifications development process.

Sources of specifications changes

A study showed that 82% of all changes made to program specifications after programming had begun were avoidable — the result of errors.



Information provided by Kapur & Associates. Inc. survey of 68 oevelopment projects. 1983-84.

From the figures above and our experience in evaluating a large number of program specifications, we can draw the following conclusions regarding the quality of program specifications development procedures:

- Most programs are not fully specified.
- Poorly written specifications require constant reworking of the program during the development phase.
- Programmers often try to implement the solution without first getting a full grasp of the total problem.
- Far too many omissions and errors are discovered after programs are put into production.
- A large number of program defects can be traced to avoidable problems.

Our conclusions are well corroborated by others, as seen in the following:

"If the requirements statements are erroneous or incomplete, how can the resulting application system be expected to perform satisfactorily?" [*EDP Analyzer*].

"Most specifications leave out a very important piece of information — a statement of exactly what a program is supposed to do and why . . . that and other necessary information eventually gets discovered and included in a program, but unfortunately it is often not discovered until the end." [CW, Dec. 13, 1985]

In addition to these problems, the typical program specifications-writing process presents some drawbacks. The level of detail and the sequence of the information developed for program specifications within the same project differ considerably from author to author. In fact, the level of detail and the sequence of information can differ in different program specifications by the same author. If a particular author is not available, determining the status of his specifications, or his work in progress, is usually next to impossible.

It is imperative that MIS management come to grips with this problem and develop a sound plan for improving the specifications-writing process. The following steps are recommended:

Set up a system for developing high-quality, well-written and well-organized specifications using a standardized outline that helps the specification writer avoid common pitfalls.

Kapur & Associates has defined a standard set of items that make up the specifications of a typical program:

Program Logistics

- Program number (ID), name, type.
- Functional narrative.
- System/project name.
- Work order/charge number.
- Project leader/user representative.
- Specification author.
- DP priority and delivery schedule.

Operating Information

- Frequency of run.
- Operating environment: previous program, next program, re-entry requirements, expected response time, equipment, language and preprocessor, operating system, storage restrictions, security.
- Data volumes.
- Program messages.
- List of console/printer messages.
- Recovery/restart/backup procedures.

Program Logic

- Data flow and I/O diagram.
- Data base information.
- Copy books.
- Called programs/modules/routines.
- Teleprocessing information.
- Functional stability analysis.
- Software objectives.
- Suggested procedures.
- Audit and control requirements.
- Impact on other programs and systems.
- "How to" instructions.
- Walk-through plan.
- Test plan.
- Specifications approval.
- Specifications change log.
- Correspondence/notes.

In any given project, the project leader, working with analysts and programmers, tailors the master list to fit the specific needs of the project. It is important to point out that once this list is finalized, specifications for each program within the project must consist of the specific items on this list.

If a particular item is not necessary for a specific program, the author enters N/A (not applicable). The master-item list is supported by reference text that explains each item in complete detail.

Use an interactive specifications-writing process. This will be of great help to the specification writers.

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writing and maintaining specifications, we have developed an interactive specifications-writing program with the ability to customize the master item list as well as to interactively develop program specifications. In addition, the program features a Help facility that contains explanations of each of the items in the master list.

Our experience shows that this approach to developing program specifications goes a long way toward solving the key problems listed earlier. The resulting specifications are complete and easy to maintain and provide a standardized set of documentation for all programs within a project.

Rigorously analyze and review program specifications before beginning to design and code the program. Involve users in this process and obtain their approval of the specifications.

Users' rejection of specifications is the nemesis of MIS. It is truly astonishing that so many programmers begin to design or even code a program without ever having the users review and approve the specifications. A programmer must not start to design a program without having user approval of program specifications.

User approval does not mean that specifications cannot be changed. It simply means that the users have read the specifications and understand them. In addition, the specifications completely and clearly define the need or problem as currently understood. Finally, users give approval for the programmer to proceed with program design and code.

In our work as consultants, we require that each program specification be reviewed and approved with signature and date by both the user project leader and the MIS project leader. For those who find some objection to this approach, please note that similar review and approval signatures are required on engineering blueprints, diagrams and specifications. Objections to such review and approval of program specifications indicate a lack of professionalism.

It has been our experience that a well-organized approach to developing program specifications helps prevent and detect defects during the early stages of program life cycle.

Considering its reliability and effectiveness, this specification development approach might be expected to be fairly common practice in the industry. Unfortunately, the facts are far from encouraging.

During the past two years, we have surveyed 37 major MIS installations regarding their specifications development process (see chart page 75). These survey results clearly show the MIS industry has done little to address the important problem of poor specifications.

During follow-up interviews with a number of project leaders and programmers, a large majority indicated a need for a standardized approach to developing program specifications, but most of them complained that their managers and users would be difficult to convince.

In separate interviews, a number of MIS managers said they liked the idea but were apprehensive about asking their staff and end users to conform to such discipline.

Implement a change-control procedure to assure the integrity of all program specifications. Once specifications for a program have been reviewed and approved, any changes must be formally requested using a standardized change request form.

The following suggestions can help manage changes to program specifications:

- Each change request must be evaluated for its effect on the completeness of the final product, its benefits to the user and its impact on software reliability, project schedule and cost.
- If the change request is approved, the program specifications must be updated.
- The revised specifications should be reviewed and approved by the user.

Our experience shows that use of the methods outlined above will easily increase productivity from 20% to 40% and reduce defects by between 20% and 30%.

Program design

The next step in a program's life cycle is to draw diagrams depicting one or more solutions to the problem. It is discouraging that many programmers do not draw even one diagram, let alone multiple possible solutions from which the best can be selected. Confidently ignorant programmers often proclaim, "I never draw a diagram; I go directly to coding from specifications." Try telling that to a structural engineer.

A 1978-1979 Kapur & Associates study of the number of errors typically made during the design of a file update program showed that close to 70% of the programmers had two or more

Survey: How thorough are your specifications?

Circle the appropriate number for each item below as it applies to your current project. For many companies surveyed, the bulk of the responses are either 1 or 2.

	Often				Seldom
Program specifications contain (hidden) errors and omissions	1	2	3	4	5
Design decisions are based on personal preferences	1	2	3	4	5
Program design process is informal	1	2	3	4	5
Programmers begin to code before the program design is complete	1	2	3	4	5
Inadequately defined software objectives	1	2	3	4	5
Programmers spend too much time correcting errors that are the result of poor specifications	1	2	3	4	5
Poor and inadequately enforced standards contribute to poor quality of programs	1	2	3	4	5
Far too many omissions and errors are discovered after implementation	1	2	3	4	5
Inadequate commitment to quality software by management	1	2	3	4	5
Inadequate commitment to quality software by end users	1	2	3	4	5

Information provided by Kapur & Associates, Inc.

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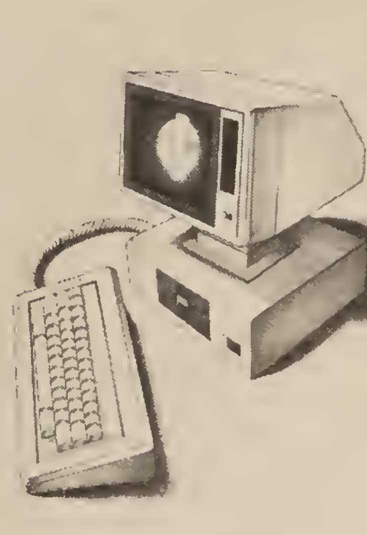

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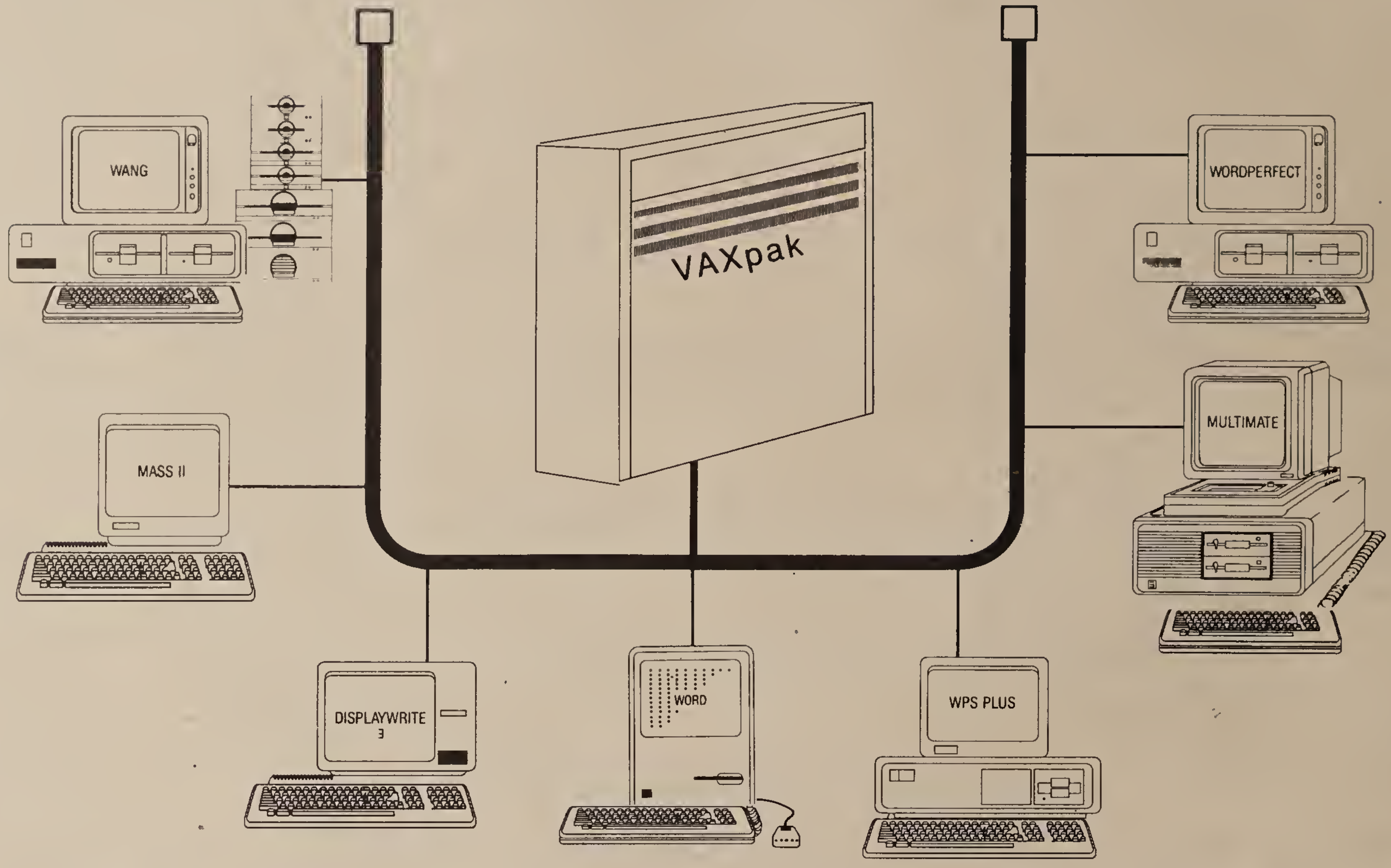

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serious errors in their solution. A follow-up study of 317 programmers during 1984 and 1985 showed no appreciable reduction in the number or type of errors.

Analysis of the diagrams developed by the participants in the latter study revealed the same flaws as in the original: nonstandard logic patterns, an unacceptably high rate of predictable and avoidable errors and sparse use of standardized program models.

A selected subgroup of the programmers in both studies were asked to write code using their diagrammed logic. Nearly 60% of the group discarded their diagrams at about mid-point in their code because they either discovered too many errors in their design or found the design difficult to translate into code.

All of these programmers redesigned their solutions while writing the code — a dangerous approach from a software reliability standpoint as well as a loss of programmer productivity.

The original study reveals that nearly 80% of all programs written in the business environment fall into the following repeatable generic types:

- Data validation/edit programs.
- Error message output routines.
- Data selection/extract programs.
- File update programs. As a subgroup, this includes sequential and nonsequential file update. Further subcategories include single or multiple transactions per master.
- Report programs — from one to multiple control breaks.
- Table handling routines.

This list can be brought up to date by adding screen painting models, on-line data entry and data validation models.

The breakdown of this list simply indicates that 60% to 70% of all MIS code does not need to be written from scratch, thereby simplifying the code-writing process.

Consider, for example, a sequential file update program. Anyone who has ever written such a program knows that there are typical errors made by all programmers. We all know how traumatic it is to come to end-of-file status during such programs. Many programmers find it almost impossible to write end-of-file logic without using complicated multiple switches.

Similarly, in case of reports with control breaks, things go haywire when controls break. Ask a programmer to write a seven-level control break program and watch the panic.

However, the logic for seven-level control breaks is no more difficult than that for two-level control breaks.

We have developed standard program models, or logic diagrams, for each program type listed earlier. This approach not only assures error-free logic structures but also creates standardized programs that are easy to maintain.

Each program model is accompanied by a pseudocode solution to guide the programmers in coding their specific programs. This approach has many benefits:

- It standardizes solutions to various types of programs.
- With the use of predrawn diagrams and accompanying pseudocode, programmers are not given the opportunity to make certain errors (such as logic drivers, logic paths and primary functions).
- The use of standard models and their pseudocode reduces the amount of original code written by programmers. The amount of code

> *Confidently ignorant programmers often proclaim, "I never draw a diagram; I go directly to coding from specifications." Try telling that to a structural engineer.*

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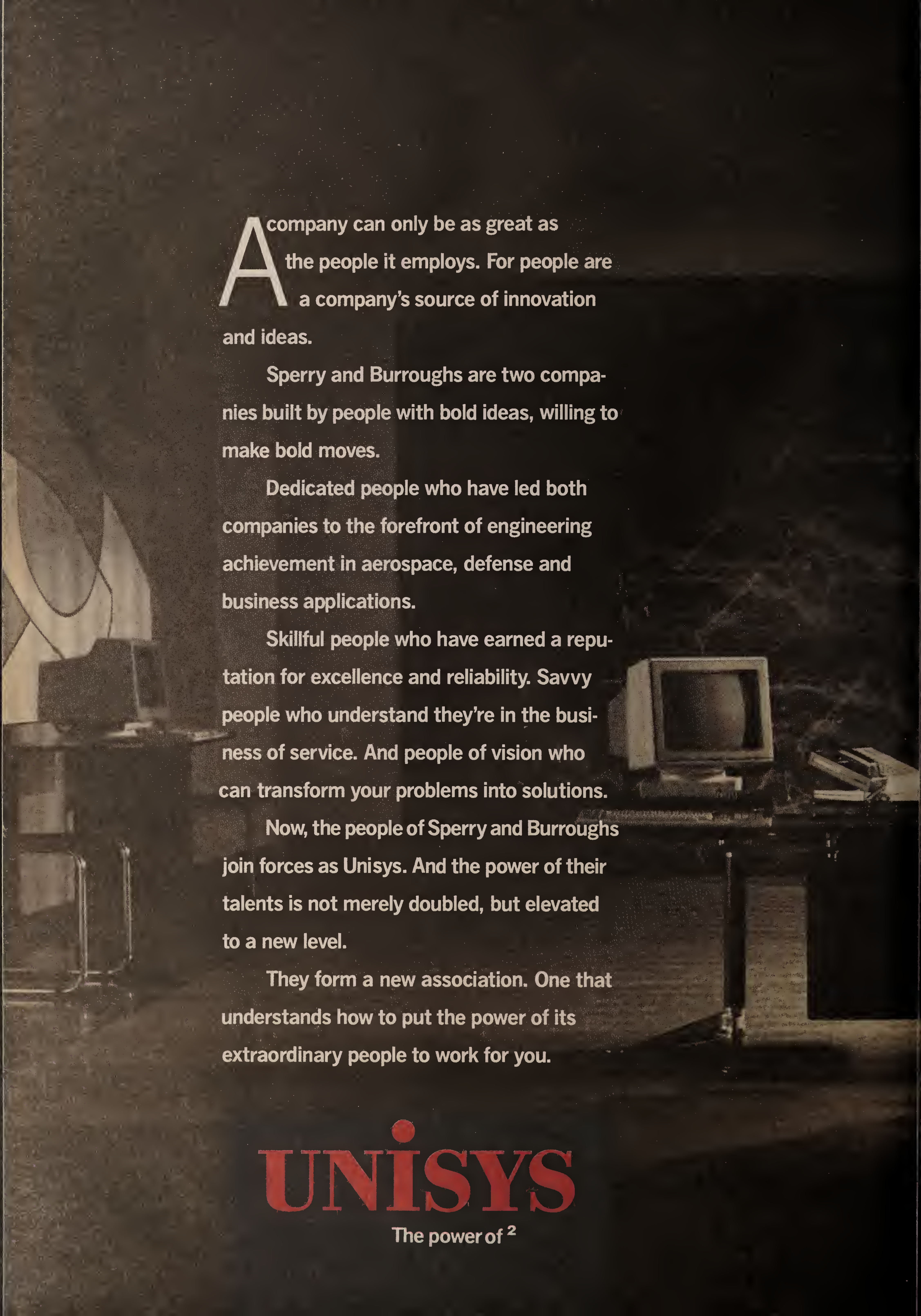

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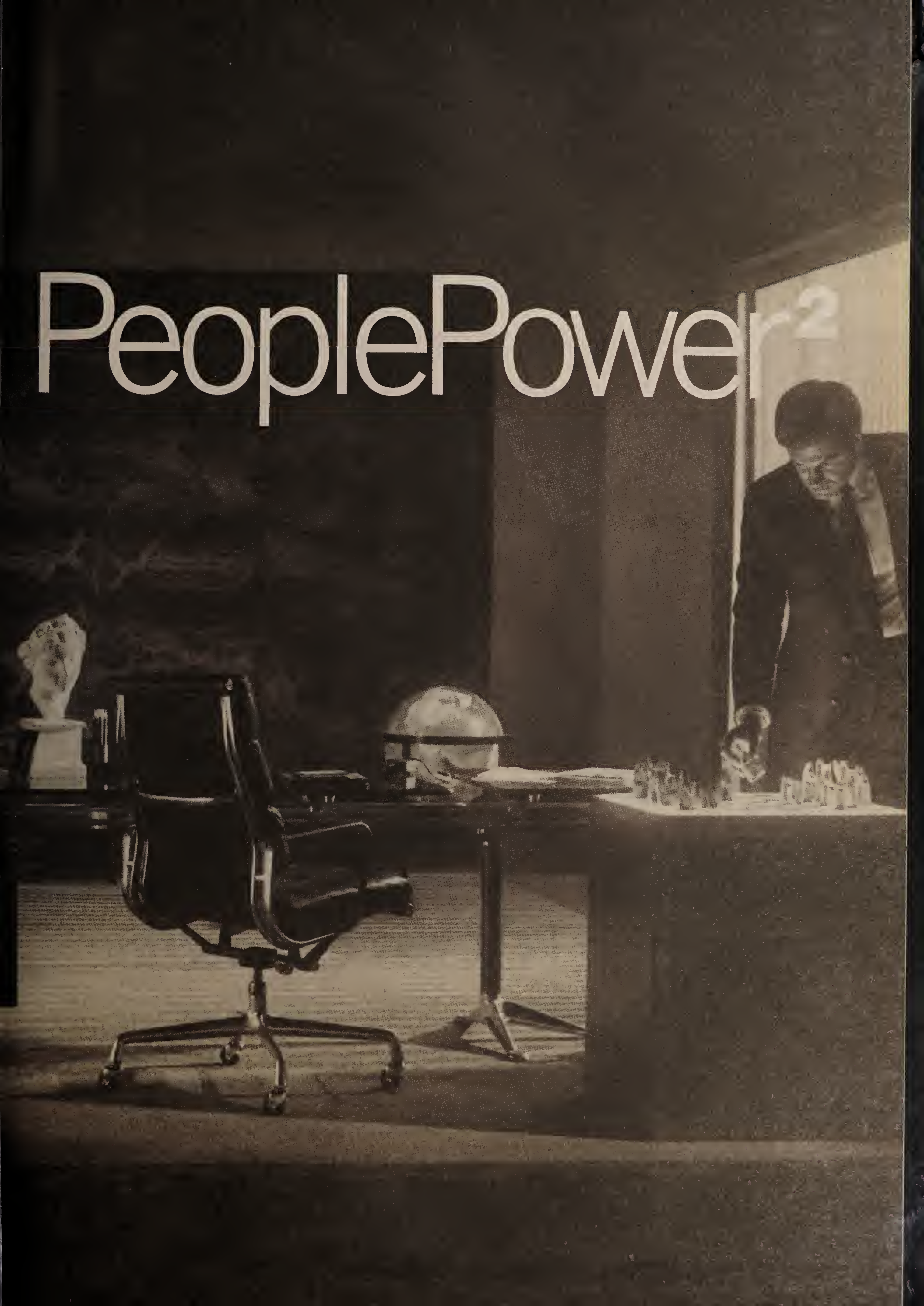
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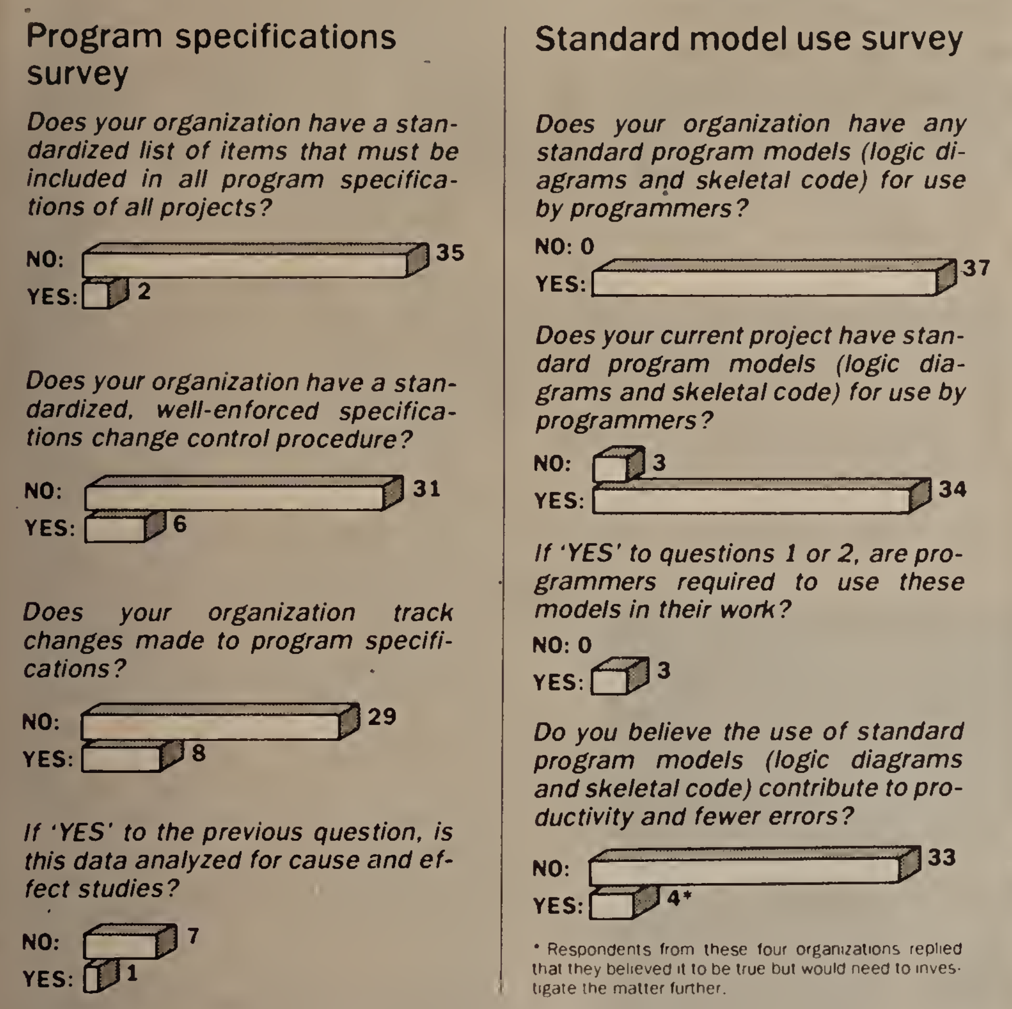
Does DP believe in standards?

Surveys show many DP departments are not taking advantage of standardized programming procedures as a way to reduce errors.



Program specifications survey

Does your organization have a standardized list of items that must be included in all program specifications of all projects?

NO: 35
YES: 2

Does your organization have a standardized, well-enforced specifications change control procedure?

NO: 31
YES: 6

Does your organization track changes made to program specifications?

NO: 29
YES: 8

If 'YES' to the previous question, is this data analyzed for cause and effect studies?

NO: 7
YES: 1

Standard model use survey

Does your organization have any standard program models (logic diagrams and skeletal code) for use by programmers?

NO: 0
YES: 37

Does your current project have standard program models (logic diagrams and skeletal code) for use by programmers?

NO: 3
YES: 34

If 'YES' to questions 1 or 2, are programmers required to use these models in their work?

NO: 0
YES: 3

Do you believe the use of standard program models (logic diagrams and skeletal code) contribute to productivity and fewer errors?

NO: 33
YES: 4*

* Respondents from these four organizations replied that they believed it to be true but would need to investigate the matter further.

Information provided by Kapur & Associates, Inc. surveys. Program specifications survey represents responses of 37 major MIS installations, 1985-86.

supplied by models varies from 40% to 70%.

These findings and conclusions are corroborated by many other researchers. According to researcher Capers Jones, 75% of all application programs, 50% of all systems programs and 70% of all telecommunications programs contain significant amounts of identical functions.

Unfortunately, the MIS industry has paid only lip service to the use of standard models — diagrams and pseudocode — in developing programs (see chart at left). While programmers sometimes copy code from existing programs, too many programmers still write code from scratch using diagrams that they also developed from scratch — an extremely unproductive approach and one that does not produce standardized code.

From this survey, the industry appears to have put forth little effort to promote program models as a viable and effective programmer productivity tool.

Software engineering

Another important part of sound program design and programmer productivity is software engineering. A well-engineered program is easy to evaluate for completeness, correctness and reliability (absence of defects). In addition, a well-engineered program is much easier to maintain, which can mean considerable cost savings.

The MIS industry has done little to address this important area. In the absence of any engineering discipline from which to learn, most programmers learn to design and code by mimicking other people's low-quality programs rather than through building a solid foundation of software engineering and design.

To illustrate the importance of software engineering, consider three systems — banking, telephone switching and air traffic control — each with two types of defects: errors in logic and system downtime.

In a banking system, downtime is much more acceptable than errors in computations. In a telephone switching system, errors (misconnection of telephone lines) are much more acceptable than downtime. However, in an air traffic control system, neither errors nor downtime is acceptable. The approach and effort to design, review and test programs for these three situations will be quite different.

It is important that software designers and programmers be cognizant of the specific objectives to be considered for a given program. These objectives include reliability, generality, fault tolerance, human engineering, adaptability, security and efficiency.

Our experience shows that the use of standard program models and logic structures will easily improve productivity from 20% to 30% and reduce errors by 20% to 30%. After these steps have been successfully implemented, then begin to add other tools, such as code generators, fourth-generation languages and workbenches.

It is hard to believe the havoc a

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simple language like Cobol has caused in the MIS industry. Cobol utilizes a limited vocabulary, a rather simplistic structure and grammar with the complexity of a Sesame Street episode.

Nonetheless, the chaos caused by its misuse is unbelievable. Many programs are little more than a hodgepodge of absurdly strung together, incomplete sentences, with meaningless programmer-supplied names and less readability than Egyptian hieroglyphics.

Most programmers refuse to maintain another programmer's code and declare the code worthless. It is interesting to note that the DP industry, including all of its illustrious vendors, has not been able to set forth standardized procedures and guidelines for "good" use of Cobol for the last two decades.

> ***'Programmers who are given an opportunity to participate in standards and procedures development are much more likely to heed those guidelines than programmers who have a set of ironclad rules rammed down their throats by top management.'***
>
> — Dorothy Deran
> Syntex Corp.

This does not bode well for the MIS professionals responsible for producing more than 90% of the information needed to run the business of our country.

In fact, the useless drivel written about just one simple instruction (GOTO) is sure to cover more pages than *Shogun* and *War and Peace* combined. Still, there is little consensus on the proper use of this instruction.

Typical Cobol program code falls into the following categories:

A set of programmer-defined data and procedure names. Cobol, with its facility for allowing 30-character, programmer-supplied names, makes it rather easy for any professional programmer to create meaningful mnemonic names. However, a large number of these "professional" programmers insist on writing such names as SW, SW1, 1SW, F2, 2F, YUKSNORT, THUMB, INDEX FINGER, PALM, FINGERPRINT and HAND (the last six names are from a payroll program).

The logic drivers — the logic to start, process and terminate the program. This part of the code can be 90% standardized if one uses standard program models described earlier in this article.

Logic for data I/0. These instructions relate to the reading and writing of a limited and predefined set of file structures. More than 90% of this code can be made standard if one uses standardized I/O routines.

Code for transformation of data. This consists of data manipulation, mathematical computations and decision-making instructions. Only the last are at all complex.

A fair percentage of data transformation code does not need to be written over and over again from scratch.

For example, customer ID validation routines, parts validation routines, date validation and conversion routines and a large variety of similar common functions abound in any business system.

Of these four categories of code, a programmer needs to write new code only for nonstandard data transformations, meaning only 20% to 40% of source code needs to be written from scratch.

This approach will not only help improve code development productivity but will also help reduce the opportunities for introducing errors into a program.

In considering programmer productivity, MIS managers should be asked the following questions:

- Why do you allow programmers to write practically all of their code from scratch?
- What would be the impact on coding-related problems — errors, complexity, debugging and maintenance — if programmers were not allowed to write common code over and over again?
- What would be the impact of reusable code on program development and program maintenance? The bottom line is that reusable code limits the opportunities to make errors.
- Does your organization have well-defined standards and procedures to guide programmers in writing their programs?

An important note regarding the last item: Make sure that your staff participates in defining and developing standards, procedures and guidelines.

As Dorothy Deran, director of research information systems at Palo Alto, Calif.-based Syntex Corp., observes, "Programmers who are given an opportunity to participate in standards and procedures development are much more likely to heed those guidelines than programmers who have a set of ironclad rules rammed down their throats by top management."

The next step toward assuring a high-quality program is the use of a detailed checklist to evaluate the quality of source code. This checklist, called a program maintainability analyzer, contains questions

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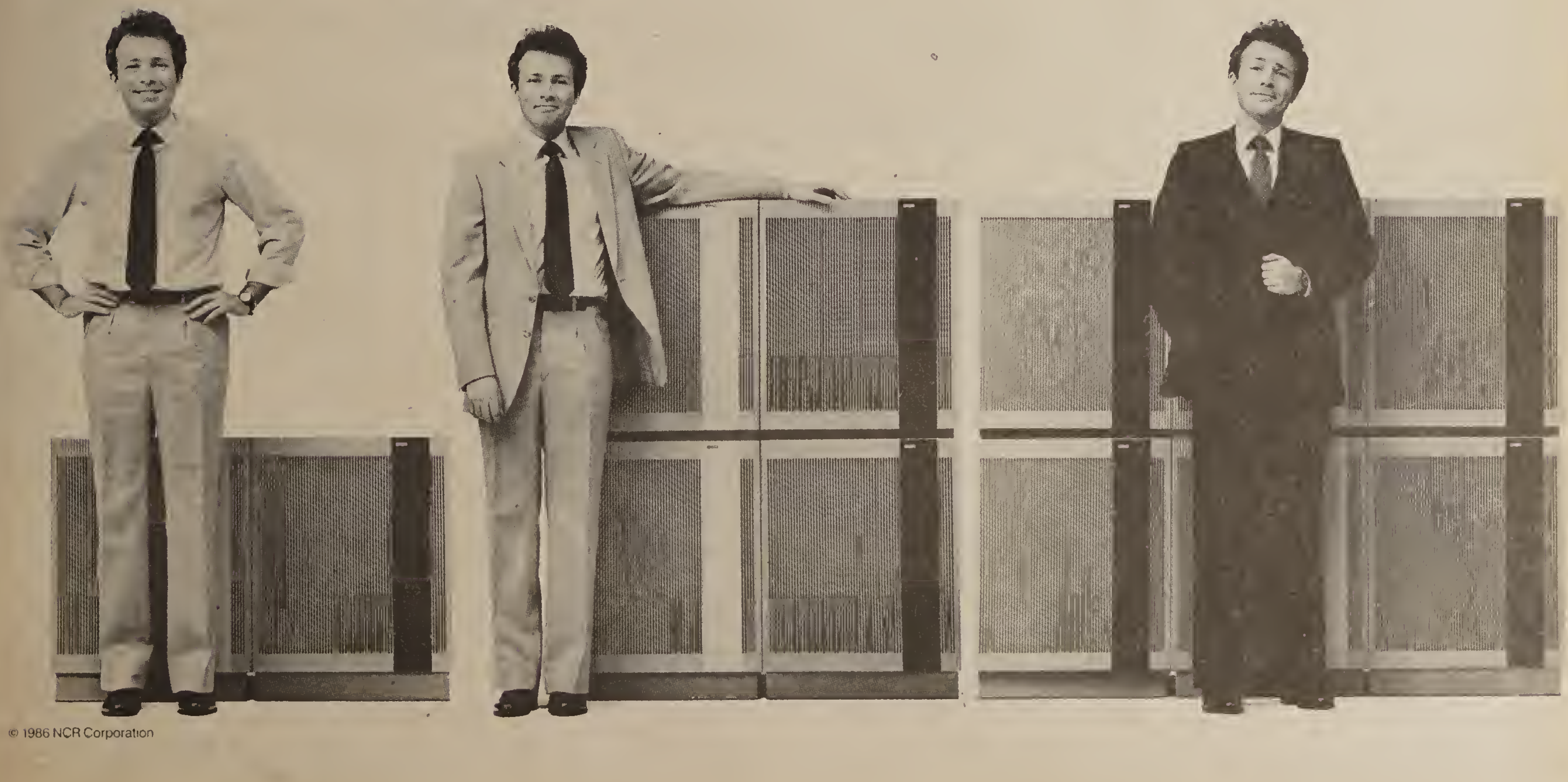

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In Depth/Programmer Productivity

designed to evaluate the true quality of a Cobol program.

The result of an audit using this checklist is a program maintainability index. This indicates the quality of the program's structure, organization, language use, adherence to standards and documentation.

Now don't tell me, "This approach limits programmers' creativity." Any programmer who finds writing code from scratch creative should be banished to helping system programmers convert binary numbers to hexadecimals.

Our experience shows that the use of the methods described above will easily improve productivity by 20% to 50% and reduce defects by 20% to 30%.

If we were to add workbenches, syntax checkers, code generators and other similar tools to the list above, we would improve programmer productivity appreciably.

An old programming adage states, "If it runs, it must be production; if it fails, it was a test." Few of us would fly in airplanes if the aviation industry subscribed to this approach.

Testing

Testing to most programmers is the act of validating code. This, unfortunately, is an extremely limited and narrow view of testing.

To achieve its purpose, testing should begin much earlier, toward the end of the specification phase, when the cost of detecting and correcting defects is low and the probability of detecting and correcting them successfully is high.

The only method for testing during the specification and design phases is the walk-through. Walk-throughs provide the most effective and cost-efficient method of testing specifications, design and code. Unfortunately, walk-throughs are either not done at all or are done poorly — often resulting in walk-outs.

The quality of machine testing is directly related to the quality of the test data used to test a program. If the test data is developed without using certain proven methods, the resulting test data will not provide for rigorous validation of the program. The worst practice is the use of live data (data gleaned from production files) — such testing is almost worthless.

We use a combination of function-dependent (black box) testing and procedure-dependent (white box) testing to create test data.

The main objective is to create test data that provides maximum test coverage. Procedures include cyclomatic complexity analysis, equivalence partitioning, boundary value analysis, error guessing and multiple condition coverage.

Additional test data for a given program is created to test the specific algorithm and the coding style used in the program. To accomplish this, the person responsible for creating test data must read the program code and create test data to validate the program structure and style.

This may seem tedious and time-consuming, but without such an approach, the quality of the product will be far from satisfactory.

In addition, experience has clearly demonstrated that if end users are not involved in the creation of test data and evaluation of the test results, the possibility of meeting user requirements is close to nil. To not involve the user is to court failure.

Another point of concern is the lack of data collected related to program defects. Few MIS organizations maintain a formal procedure to catalog and categorize defects detected during walk-throughs, testing and production.

For example, very little information is available on the types of errors most common in different types of programs, how and where these errors enter the program, why they go undetected and how the errors could be kept from entering the system.

A majority of programmers interviewed object to any formal record keeping because they fear management would use the information to evaluate and punish programmers —

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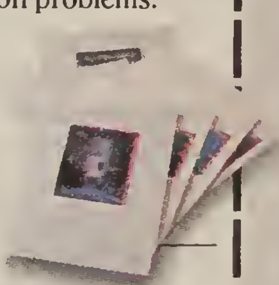

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> ***User approval does not mean that specifications cannot be changed. It simply means that the users have read the specifications and understand them.***

a sad commentary on MIS management.

When properly conducted walk-throughs are combined with the machine testing methods outlined above, an increase of 20% to 30% in productivity is normal. Additionally, defect detection improves by 40% to 50%.

Tools and techniques

If you are serious about producing error-free software and improving your programming staff's productivity by 100% or more, we strongly recommend that you develop a plan to implement the following programmer productivity and defect reduction tools and techniques:

- Standardized program specifications.
- An automated, or interactive, specifications-writing process.
- User review and approval of specifications.
- Rigorous change control procedures.
- Standardized program models and program logic structures.
- Programming standards, procedures and guidelines.
- Appropriately timed and well-conducted walk-throughs.
- Creation of good test data.
- End-user review and approval of test results.
- High-quality education and training for your programming staff.

The last item should not be taken lightly. I have found that a majority of programmers are poorly educated and inadequately trained. This occurs primarily because most programming education is by the rote method, in which participants are not taught how to analyze a problem nor how to derive a sound solution.

Unfortunately, a number of people who teach and write about structured programming teeter on the edge of programming illiteracy with very little documented experience in developing well-engineered, error-free software.

I suggest a rigorous training program for your programming staff by qualified instructors who have recent experience in design and implementation of high-quality software.

If you hire outside consultants to provide training, make sure you take the time to check their backgrounds, with special emphasis on their recent practical experience.

If you would like to further increase your staff's productivity and improve the quality of the software produced, do them a big favor — teach them how to write well.

One unfortunate fact of life is that a large number of programmers and analysts have considerable difficulty in writing clear, complete and correct specifications.

It is the rare programmer who has heard of *The Elements of Style* by Strunk and White. Buy a copy for every programmer and analyst on your staff and make sure they read it.

Engineers have a saying: If you are going in the wrong direction, let us hope you are going slowly. This maxim certainly holds true in the case of programming. A programmer prone to writing error-laced code will produce many more problems when given the tools to produce code faster.

If you are waiting for a miracle to happen through the use of workbenches and fourth-generation languages, you are simply deluding yourself and doing a great disservice to your organization and the profession.

Stop waiting for the miracle and start implementing practical and cost-effective tools and techniques. ■

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MANAGEMENT

TAKING CHARGE
John M. La Tronico

Grilling revisited

Alan Brill made several poignant statements in his Taking Charge column, "Grilling Your Consultants" [CW, Oct. 27]. Although his article was obviously intended to help management personnel make responsible, conscientious decisions regarding the use of consulting services, Brill was only able to discuss one side of a two-sided issue.

It is important to understand that consulting is a business just like banking or manufacturing or Brill's employer, the New York City Department of Investigation. Just as any other business, consulting firms are successful only as long as their product meets client demands and produces the required results.

Additionally, a consulting firm's sole source of revenue is its ability to maintain staff members in a revenue-generating capacity. These points are made so that the following discussion of Brill's grilling procedure may be seen not as a defense but as an explanation of procedures.

Brill's first statement was to ensure that specific experience for each individual be determined. There is no argument on this point other than to say a reputable consulting firm will be sure that individual resumes provide a level of detail that should at least allow the prospective client to make solid decisions as to which consultants meet the majority of the requirements.

References should be available, but

See **GRILLING** page 86

La Tronico is executive vice-president of Just Technical Associates in Dallas.

Sea-Land launches system

Strategic move automates cargo booking, tracking

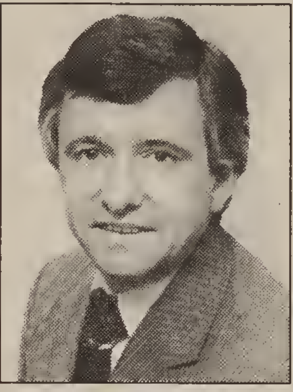
By David A. Ludlum

ELIZABETH, N.J. — Sea-Land Corp., a leading operator of cargo ships, is launching a customer information and booking system that it expects will boost sales and market share.

The system, named Sea-trac, lets customers look up shipping schedules, book cargo shipments and then track the cargo using their own IBM or compatible personal computers and McDonnell Douglas Corp.'s Timenet public data network.

Sea-Land operates 57 container ships and more than 100,000 containers in 64 countries and territories, generating annual revenue of about $1.6 billion. The company is being acquired by CSX Corp. of Richmond, Va., a railroad, barge and energy concern.

Sea-trac leverages internal Sea-Land systems, primarily the one for tracking cargo. That system contains information on containers' contents, owner, shipping rates and handling requirements as well as data for loading ships for weight distribution, easy unloading and placement of perishable and hazardous cargo.


R. J. Beedenbender

Sea-Land has experience with electronic data interchange with customers equipped to receive information electronically, said Richard J. Beedenbender, vice-president for information resources.

"All we're really [introducing] now are the value-added networks and personal computers," Beedenbender said.

Burton Strauss, a shipping industry analyst with E. F. Hutton & Co., said he is not

See **SEA-LAND** page 80

Execs say business know-how, attitude are the right stuff

By David A. Ludlum

WELLESLEY, Mass. — Valuable MIS recruits are those with a broad understanding of the industry in which they would work or knowledge of key technical areas, along with maturity and a practical outlook, according to two top executives.

The need for these characteristics follows in part from the evolution of corporate information services toward a network of distributed processing centers and customer-oriented systems, the executives said.

Traits sought in junior MIS staffers were discussed by William R. Synnott, senior vice-president of the First National Bank of Boston, and Michael Simmons, president of Fidelity Systems Co., the data processing arm of Fidelity Investments Co. of Boston, at a Nov. 18 panel discussion here at Babson College's Center for Information Management Studies and in subsequent interviews.

William R. Synnott

"Above all, we need broadness. Broadness is the key to the people we bring in," Synnott said, emphasizing a need for candidates who understand the First National Bank of Boston's business.

That understanding can be found in graduates of master of business administration programs, he said. Some of those graduates are turning to information systems as a training ground for top management because the work can

See **EXECS** page 86

INSIDE

Bank employee charged in credit card fraud/**80**

Calendar: Selected conferences, exhibitions, seminars/**82**

INSTANT ANALYSIS

"I cannot be the wall that stops a new product from coming out."

— William H. Anderson, senior vice-president, information systems development, Prudential Bache Securities, Inc.

Night-shift work includes crime and personal business

Lack of supervision, inexperience are cited

By Jeffry Beeler

Allegations that a swing-shift worker misused his employer's mainframe to abet reputed drug dealers underscore an unpleasant truth that many organizations have already learned from personal experience: If systems employees are going to commit serious errors or willfully misbehave at work, they are most likely to do so after dark, when many data centers depart sharply from their daytime mode of operation.

Last April, an operator in the California Department of Justice's Law Enforcement Data Center (LEDC) was arrested and charged with unauthorized disclosure of restricted government information. Working at night, the defendant allegedly passed criminal histories and auto registration records to reputed cocaine peddlers, who reportedly used the material to screen prospective buyers, according to Municipal Court documents in Sacramento.

Late-night misadventures such as this are by no means unprecedented. The swing and graveyard shifts in corporate data centers have spawned some of the most disturbing misconduct, improbable miscues and hilarious high jinks in the annals of information processing.

- Two systems specialists who worked the graveyard shift for a large financial institution added an unapproved step to the bank's late-night procedure for closing and reopening its automated teller machines. Their improvisation resulted in a string of fraudulent ATM withdrawals totaling about $2,000 and enabled them to destroy most of the incriminating evidence, according to one of the bank's senior MIS executives, who requested anonymity. One of the perpetrators was convicted and sent to prison.
- Unable to find enough work to stay profitably occupied, a night-shift operator for a large federal agency amused himself by penetrating two unrelated data bases, one for building-contract violators and the other for communicable diseases. "He then wrote his own program with the aim of finding out which building code violators had also contracted certain kinds of VD," according to Victor Janulaitis, a Los Angeles-based systems consultant. The employee's inquisitiveness eventually cost him his job.

Truly serious instances of night-shift misconduct are, of course, the exception rather than the rule. But conditions peculiar to the swing and graveyard shifts probably make computing installations more susceptible to employee misconduct or miscalculations after dark.

One reason data center vulnerability often grows after dark is that many late-night shifts operate with smaller staffs and thus make do with less supervision than their daylight counterparts.

In at least a few DP shops, employee misdeeds during the night shift have taken the form of illicit drug use. "I myself have had problems

See **NIGHT-SHIFT** page 87

High-tech con game uncovered in California

Citibank employee charged in credit scam

By Jeffry Beeler

SAN MATEO, Calif. — A bank employee who allegedly compromised the privacy of her organization's credit card data base has been arrested and charged with abetting a fraudulent scheme to order computer equipment over the phone.

As a member of Citibank N.A.'s local collections office, Dedra Williams, 25, was assigned the job of monitoring the institution's delinquent credit card accounts. From a terminal to which she had access, Williams could go directly into the data base, according to Sgt. Art Hilborn of the San Jose, Calif., Police Department.

Unknown to her employer, Williams allegedly abused her position by feeding carefully selected portions of the data base to three unauthorized recipients who were unaffiliated with Citibank.

"She'd enter a name into her terminal, retrieve the records of all Citibank card holders who have the same name and look for accounts that combine high credit limits with low current balances," Hilborn said.

Williams then noted the names and account numbers of the card holders who met her specifications and passed the information along to her accomplices, who masqueraded as contract programmers, he added.

By the time they were finally nabbed, the suspects had allegedly used their stolen credit card information to buy $50,000 worth of microcomputer hardware from several local dealers. The loot was later resold through an Oakland, Calif.-based company called Computer Chips, Inc., founded by one of Williams' accomplices, Hilborn said.

The theft ring soured when the suspects allegedly reordered personal computer equipment from one of the dealers already fleeced. Suspicious, the dealer reported the second order to the police, who persuaded

See **HIGH-TECH** page 87

Sea-Land launches system

From page 79

aware of other shipping companies with a system similar to Sea-trac.

Sea-Land began developing Sea-trac late last year and recently completed a pilot project. There are currently about 50 users. Following a news conference last week, the system is being offered to thousands of regular Sea-Land customers.

It was developed internally with no consultants in order to maintain confidentiality, according to Jeffrey La Rose, Sea-Land's director of information management. Using personal computers for the front end sped the development, La Rose said.

The idea for Sea-trac emerged from a personal computer research and development group within a distributed processing organization at Sea-Land.

The project followed the creation of user-friendly features, such as one-button access, in an executive information system. "We said, 'If we can have that, why not go ahead and have a system for our customers so they can do the same thing?' " La Rose said.

In building Sea-trac, developers examined the shortcomings of similar systems in airline, banking and other industries and sought to avoid them, La Rose said. The major concerns were ease of use and security.

Efforts to make access easy include use of customers' existing personal computers with Timenet for the cost of a local telephone call, La Rose noted.

User-friendly aspects include one-stroke dialing and translation of jargon and other terms in the company's data base to more natural expressions, a process facilitated by the use of personal computers for the front end, La Rose said. "It presents a very simplistic screen showing function keys," he claimed.

Sea-Land built seven levels of security into Sea-trac, according to company officials. One is a read-only-memory device on customers' personal computers that identifies the machine originating an inquiry.

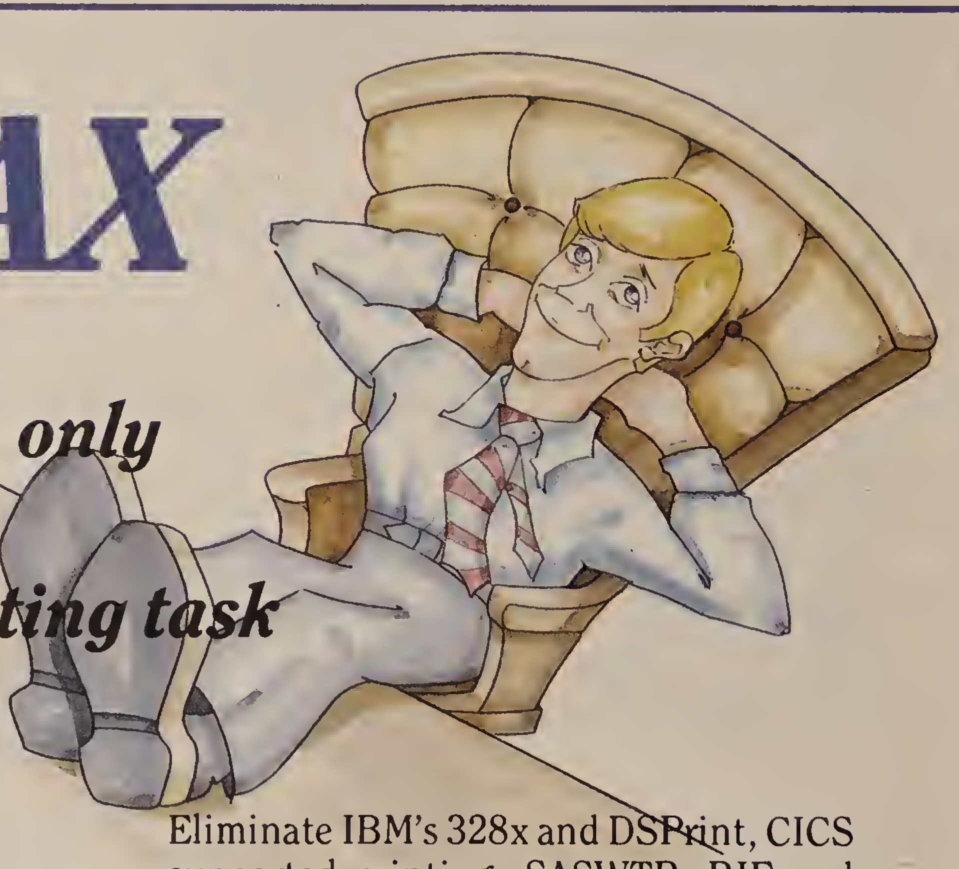
General information such as vessel schedules is accessible by all users, while only a customer should be able to access information on his account, La Rose said.

Sea-trac runs on an IBM 3090 Model 200 at Sea-Land's Elizabeth, N.J., headquarters and is written in the C language using IBM's CICS for on-line transactions. Sea-Land maintains on-line applications at 90 locations in 20 countries. It has two IBM 4300s in Hong Kong and 20 distributed IBM System/36s.

Sea-Land regards data processing as a critical success factor, and its management did not require stringent cost justification for the system, according to executives.

"We believe that technology will result in the perception of better customer service and that more people will want to ship with us," La Rose said.

"As far as we can see it's a pretty obvious winner," Beedenbender said. No new mainframe applications were required to launch Sea-trac and the overall development costs for the system "are not substantial," he added.



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CALENDAR

DECEMBER 7-13

Software Testing Management Workshops. Jacksonville, Fla., Dec. 7-12 — Contact: Software Quality Engineering, Suite 16, 3015 Hartley Road, Jacksonville, Fla. 32217. Also being held Feb. 15-20 in Orlando, Fla., and March 1-6 in San Diego.

ATS Annual Technology Symposium. Las Vegas, Dec. 8 — Contact: Boole & Babbage, Inc., 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Disaster Recovery/Contingency Planning Seminar. Cleveland, Dec. 8-9 — Contact: ISR Consultants International, Inc., Suite 103, 3455 Washington Drive, Eagan, Minn. 55122.

Financial Microcomputer Conference. Atlanta, Dec. 8-9 — Contact: Financial Managers Society, Inc., Suite 2221, 111 E. Wacker Drive, Chicago, Ill. 60601.

Applying Machine Vision to Electronic Component Assembly and Inspection. San Jose, Calif., Dec. 8-10 — Contact: SME Special Programs, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

The National Connectivity Symposium on Local Area Networks and Micro-Mainframe Links. Washington, D.C., Dec. 8-11 — Contact: Digital Consulting Associates, Inc., 6 Windsor St., Andover, Mass. 01810.

The IBM PC Data Communications Survival Course. Boston, Dec. 9 — Contact: Data-Tech Institute, P.O. Box 2429, Lakeview Plaza, Clifton, N.J. 07015.

AI and Expert Systems: Concepts and Workshop. Princeton, N.J., Dec. 9-10 — Contact: Unisys Corp., P.O. Box 2191, Princeton, N.J. 08540.

The 4th Computer Symposium for Local Government. St. Cloud, Minn., Dec. 9-10 — Contact: Government Training Service, 202 Minnesota Building, 46 E. Fourth St., St. Paul, Minn. 55101.

How to Design and Implement Bar Code Systems. Clearwater Beach, Fla., Dec. 9-10 — Contact: Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

Extended Relational Analysis Data Modeling Workshop. Hartford, Conn., Dec. 9-11 — Contact: Linc Systems Corp., 111 Charter Oak Ave., Hartford, Conn. 06106.

Imex 86. New York, Dec. 9-11 — Contact: Penton Expositions, 1100 Superior Ave., Cleveland, Ohio 44114.

Managing and Motivating Computer Professionals. Chicago, Dec. 9-11 — Contact: Gary Slaughter Corp., 400 Fifth Ave. S., Naples, Fla. 33940.

Optical Information Systems '86 Conference. Arlington, Va., Dec. 9-11 — Contact: Conference Management Corp., 200 Connecticut Ave., Norwalk, Conn. 06854.

International Conference on Management and Performance Evaluation of Computer Systems. Las Vegas, Dec. 9-12 — Contact: Computer Measurement Group, 6397 Little River Tnpk., Alexandria, Va. 22312.

1986 CAUSE National Conference. Monterey, Calif., Dec. 9-12 — Contact: Professional Association for Computing and Information Technology in Higher Education, 737 29th St., Boulder, Colo. 80303.

AI/Expert Systems. Hartford, Conn., Dec. 11 — Contact: AI Service Co., 5 Science Park, New Haven, Conn. 06511.

Software Quality Control Management Information System. Boston, Dec. 11 — Contact: International Datatek, 7 Carriage Drive, Acton, Mass. 01720.

ACE's Third Annual Computer Education Conference. New York, Dec. 13 — Contact: Association of Computer Educators, Inc., 751 Bard Ave., Staten Island, N.Y. 10310.

DECEMBER 14-20

Seventh Annual Data Training Conference and Exposition. Washington, D.C., Dec. 14-18 — Contact: Conference Registrar, Weingarten Publications, Inc., 38 Chauncy St., Boston, Mass. 02111.

Fostering Creativity and Innovation. (Satellite Broadcast) Dec. 15-19 — Contact: National Technology University, P.O. Box 700, Fort Collins, Colo. 80522.

Advanced Manufacturing Systems-West '87. Anaheim, Calif., Dec. 15-17 — Contact: John Frett or Bill Harrington, Cahners Exposition Group, P.O. Box 5060, 1350 E. Touhy Ave., Des Plaines, Ill. 60017.

Effective Management Skills for the MIS Manager. Chicago, Dec. 15-18 — Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

Improving Your Internal Consulting Skills. Washington, D.C., Dec. 15-18 — Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

Microcomputer Graphics Show. New York, Dec. 17-19 — Contact: Expoconsul International, Inc., 3 Independence Way, Princeton, N.J. 08540.

JANUARY 4-10

Developing Effective Computer Documentation. Sunnyvale, Calif., Jan. 5-7 — Contact: Information Mapping, Inc., 275 Wyman St., Waltham, Mass. 02154.

Hawaii International Conference on System Sciences. Kailua-Kona, Hawaii, Jan. 6-9 — Contact: Center for Executive Development, College of Business Administration, University of Hawaii, B-101, 2404 Maile Way, Honolulu, Hawaii 96822.

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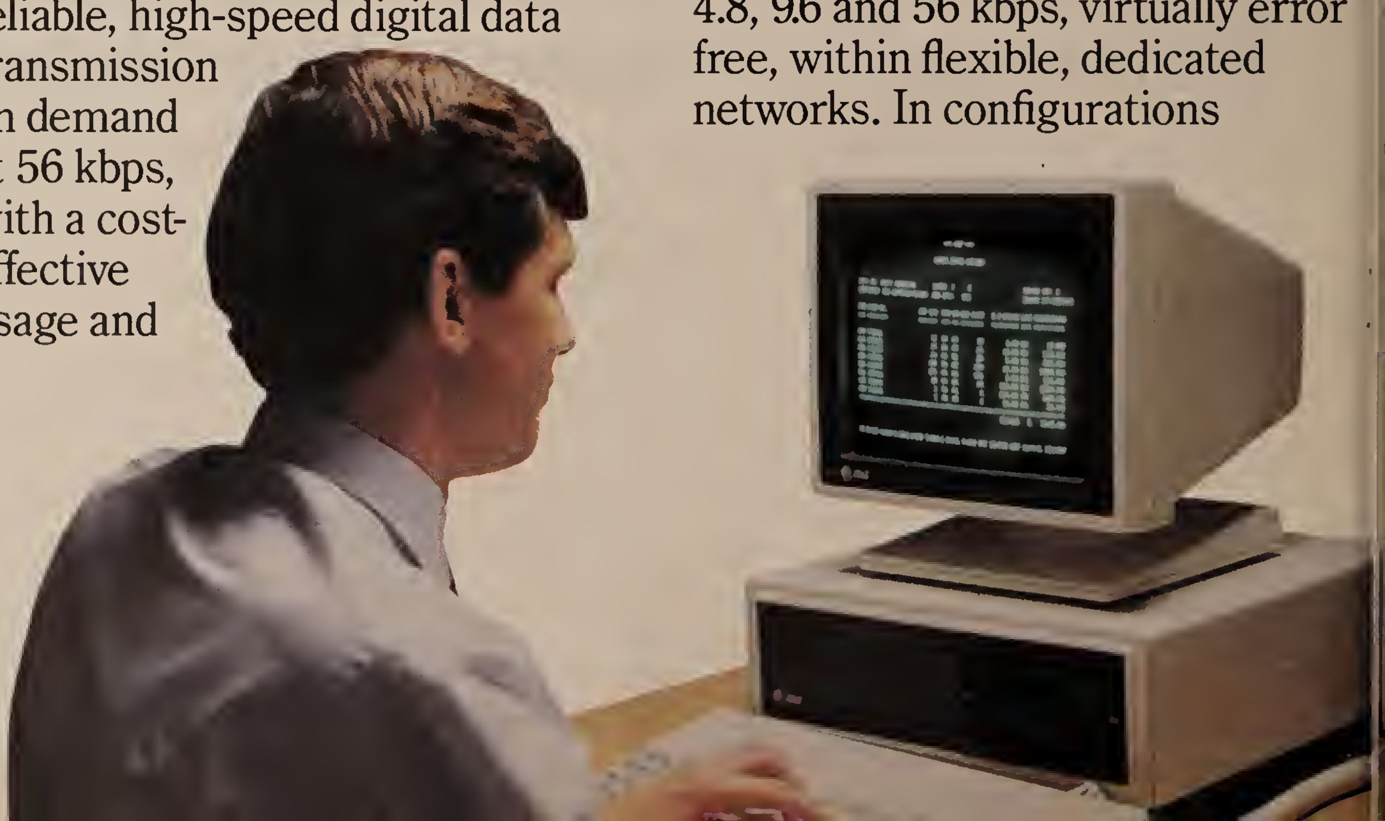

ACCUNET Switched 56 Service is currently available through over 30 access points in the U.S., with additional access points expected by the end of 1986.

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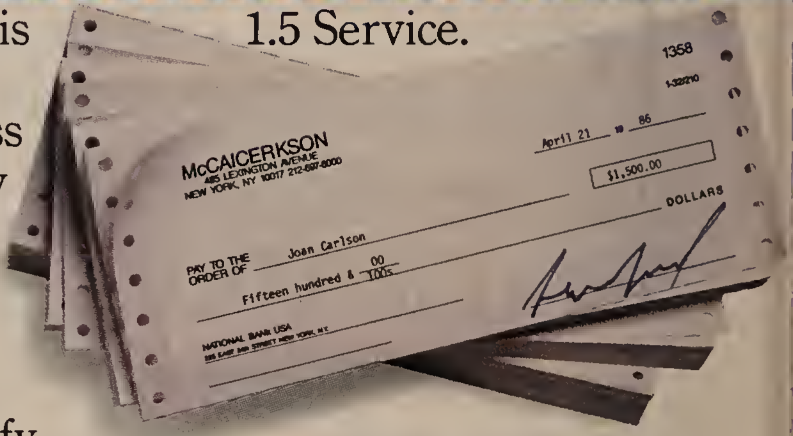

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5. Q: I work for a large corporation with many regional and remote branch offices that must tie their data transmission systems back to central processing sites.

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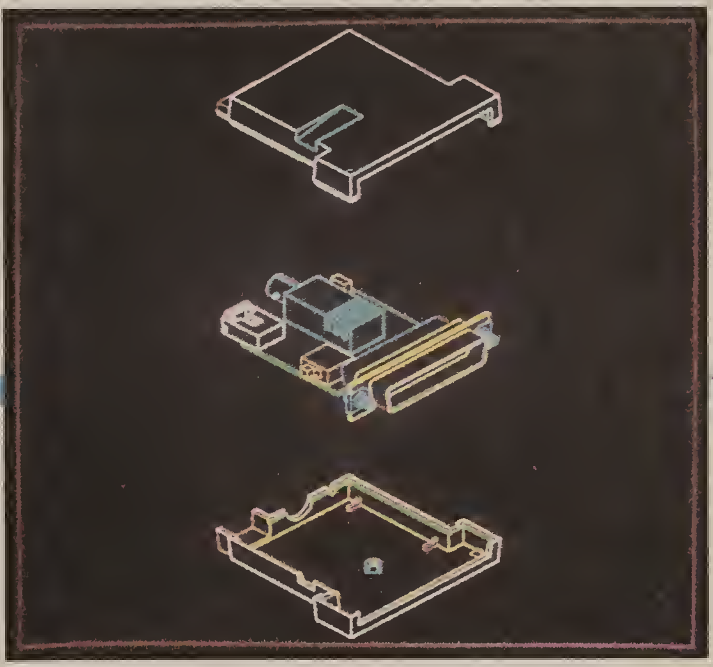

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Grilling revisited

From page 79

don't expect them to be on the resume. This area can be delicate at times due to previous client desires, changes in management at the previous client site or a myriad of other reasons. Further, the reputation of the consulting firm should count for something, since building and maintaining an excellent reputation is not easy and certainly does not occur if the consulting firm places fools on client sites or causes the client to "suffer massive aggravation."

Brill's third point addressed a guarantee that certain people would be assigned. Once again, with one condition, a conscientious, reputable consulting company will have little problem with this area. A manager charged with the task of selecting a consulting firm who insists on specific consultants cannot reasonably expect the consulting firm to wait for weeks or months for the final decision to be made.

The sole source of income for consulting firms is to maintain a billing status of 80% or greater. Allowing professional talent to remain on the bench while a bureaucratic process takes place at a potential client site causes the consulting firm to lose revenue. If this situation is allowed to exist, the client should be prepared to pay premium rates.

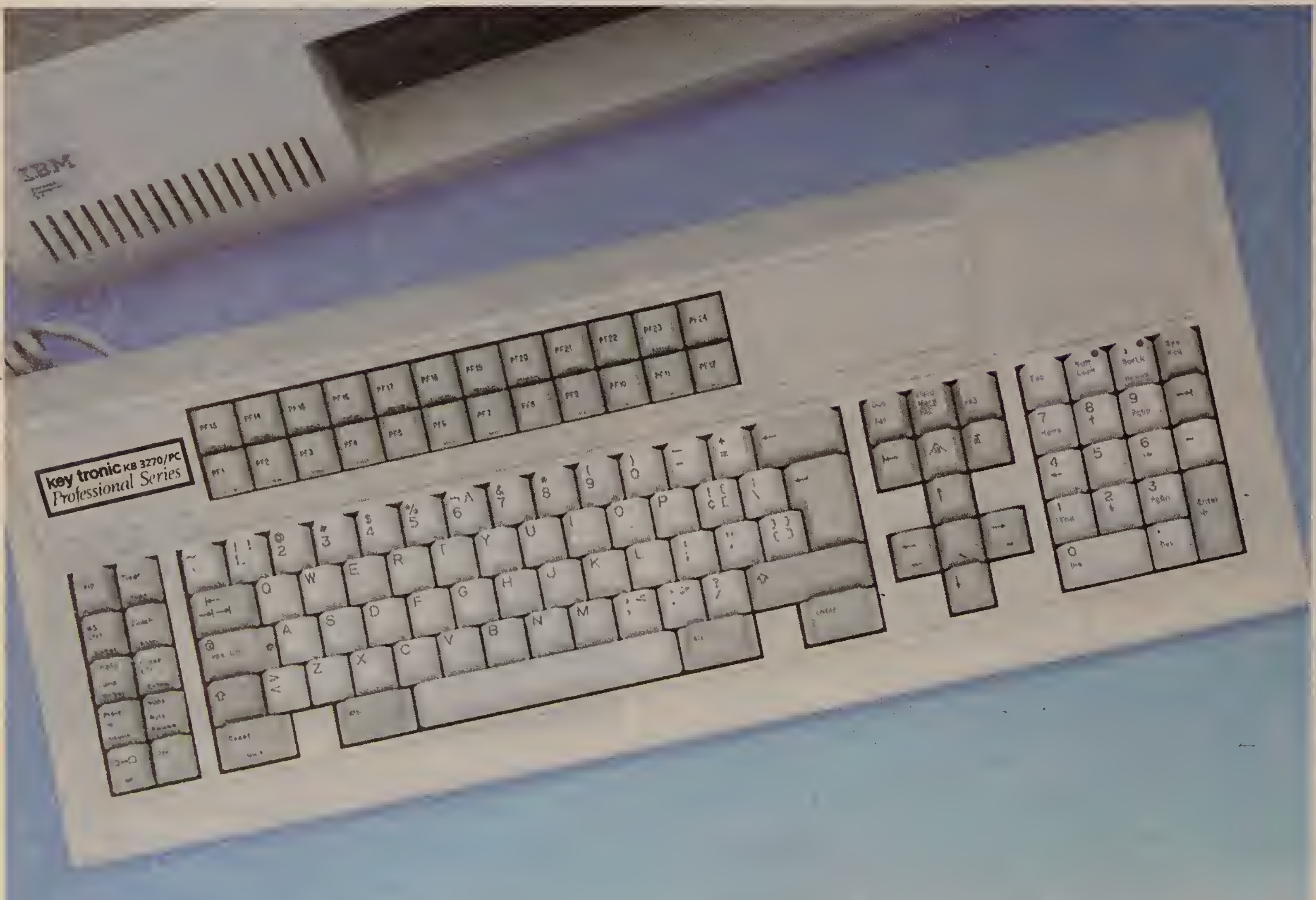
The fourth point that Brill addressed concerned liability for an unsuitable consultant. Brill advocates the idea that the client should have sole judgment in determining a given consultant's suitability. Furthermore, he states the consulting firm should suffer the loss if a consultant is deemed to be unsuitable. Under these constraints, I'm surprised that Brill is able to locate any consulting help. This arrangement can be tolerated only if detailed tasks and anticipated results are agreed to before starting the project.

The final area of discussion concerned a client's right to interview proposed consultants. Once again, there is little argument on this point as long as the client understands two conditions.

First, don't ask to interview people until the decision has been made to start the project. Interviews are a time-consuming activity for both parties and unless the decision is to be made in the near future, the consultant interviewed may not be available.

Second, understand that the proposed consultant may be in the process of completing a project. The consultant's primary responsibility must be with the current client; therefore, the interview might have to be arranged during off hours. A prospective client should appreciate this attitude, since it is the way he would expect to be treated by his consultants.

Consulting is not an easy business. The consultant and his company must be technically competent, public relations-oriented and good at sales. The best projects, the most successful projects, are those in which both the client and the consultant deal with each other as responsible adults, both of whom are interested in solving a problem.



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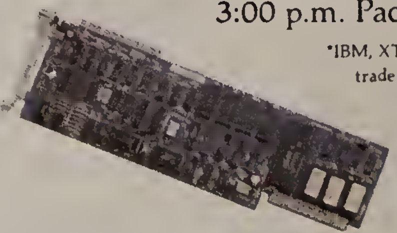

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Execs define the right stuff

From page 79

bring exposure to all parts of a business, Synnott noted. "Systems is one of the few areas where you can go in and work in all areas," he stated.

Panel member Efrem Mallach, associate professor of computer science at the Boston College School of Management, also emphasized the need for business knowledge. American Airline's Sabre reservation system was "an accomplishment of people who saw the value of information properly presented more than technology," he said.

Michael Simmons

The two executives said they use recruits with an understanding of business as specialists in end-user computing, serving as a link between users and MIS. Simmons said he has been hiring such ombudsmen for two years.

They said candidates should have some technical know-how. It is particularly valuable when a system breaks down, Simmons noted.

Fidelity and the First National Bank of Boston are also looking for specialists in "hot" technical areas such as communications and data bases. "It depends on the job you're trying to do at the time you're talking to the person," Simmons said.

Simmons and Synnott said they emphasize candidates' personal traits over specific training, with desirable ones including intelligence, maturity, ability to communicate and willingness to work as part of a team.

"We look for smarts, not courses. Even the [academic] major is secondary," Synnott said.

The executives praised the value of practical experience and criticized naive or know-it-all attitudes of recent college graduates, particulary computer science majors.

Simmons said he seeks candidates who "have been responsible for getting the laundry out, who have taken people's problems and turned them into solutions."

Night-shift work includes crime

From page 79

with employees on dope, although quite frankly, it sometimes happens on days, too," said John Brewington, corporate executive officer for operations at the Norfolk, Va.-based Sovran Bank, NA.

However, the misdeeds can take other forms as well. At a major insurance company, for example, a night shift supervisor and most of his subordinates were nabbed in the early 1980s for using their official duties as a cover for their second job as bookies. For nearly a year, the partners secretly diverted their employer's mainframe resources to calculate odds, bill their customers and track their cash flow, said Steve Peacock, vice-president of systems support at P-Cube Corp. of Brea, Calif.

The bookmaking operation might have escaped detection forever had it not caught the eye of one of the newest additions to the insurance company's night-shift staff. Disgruntled when his request for a piece of the action was refused, the newcomer took revenge on his co-workers by blowing the whistle on them.

In still other instances, inadequate supervision of swing and graveyard shift personnel has contributed to violations of personal privacy. A striking illustration occurred in the late 1970s when two male programmers at a major hospital hatched a scheme to revitalize their faltering love lives.

Working at night, they gained access to an in-house data base containing records of all the single women who had recently been admitted to the facility for therapeutic abortions. On the dubious theory that pregnancy in the absence of marriage is conclusive evidence of promiscuity, the pair then culled the names of all the women who met certain age, weight and race specifications. Sometime later, several of the former patients began receiving late-night phone calls asking them for dates, Peacock said. Alarmed, some of the women reported the intrusions to their telephone company, which tapped the lines and eventually traced the calls to their source. After being placed on extended leave, the would-be Romeos were finally fired, he said.

A second reason that many computing sites are most prone to misconduct at night is that late-night shifts often contain many entry-level employees. Probably nowhere were the drawbacks of inexperience more forcefully driven home than at a large financial services organization. "Late one night, while a fairly untrained operator was on duty, one of the firm's smoke detectors malfunctioned and triggered a chain reaction of other minor equipment failures," Janulaitis said.

The mechanical breakdowns, in turn, brought a series of audible alarms, which the operator tried in vain to silence by pushing a cluster of red buttons on his control console. When he had exhausted the last of the red buttons with no results, he pressed the control panel's lone green button and in so doing shut off electrical power for the whole building. "The company took four hours to restore its operations," Janulaitis said.

Another reason the potential for data center misadventures increases after dark has to do with the nature of night-shift work itself. Swing and graveyard shifts focus primarily on batch jobs, work that sometimes requires minimal human intervention. "Boredom is the worst enemy that a night shift faces because it makes people do stupid things," said Fenwicke Holmes, who recently retired from Del Monte Corp. as head of corporate information systems.

At some companies, bored night-shift workers have sought to fill their slack time by adapting their employers' mainframe resources to relatively harmless but unauthorized purposes. "In my consulting work, I've seen companies where systems employees bring their relatives in at night and let them use the facilities to run their own private businesses," independent security consultant Robert Campbell stated.

Idle time during the swing and graveyard shifts can also promote on-the-job socializing and create a certain esprit de corps. But sometimes night shift employees carry their camaraderie to intolerable extremes.

A top systems officer who requested anonymity recalls, "Once, we started getting repeated complaints that the company sickroom was being messed up late at night. At first, I couldn't figure out who was causing the problem. But later, I learned that two members of my night staff were having an affair and that they were using the room when no one else was there."

High-tech con game uncovered

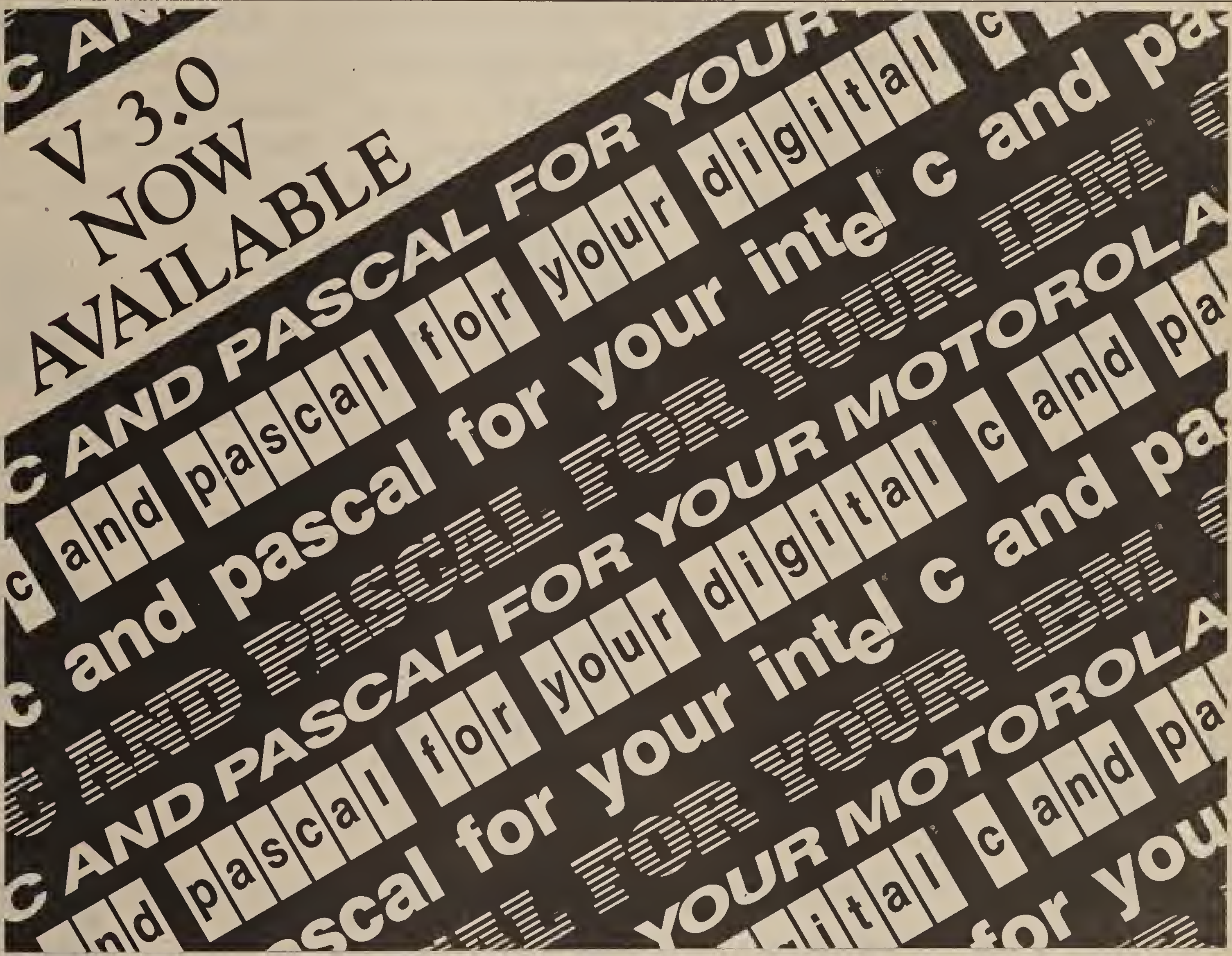
From page 80

the company to feign interest in the sale until the buyers could be identified and located.

When she was taken into custody, Williams accused the others of coercing her into cooperating with them, Hilborn said.

Also implicated in the scam with Williams are Robert Moody and Daniel Britton, both of whom have already been arrested, and Charles Gill, still at large.

The allegations against the four — grand theft, conspiracy, possession of stolen property and violation of California's computer crime law — are detailed in warrants that Hilborn filed in municipal court in San Jose.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Leader: Harold C. Folts,
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T-2 ISDN—Status and Developments

Leaders: James G. Herman, Director, and Mary A. Johnston, Senior Consultant, Telecommunications Consulting Group,
BBN Communications

In this tutorial you'll learn what ISDN will and won't deliver in the late 1980s, what the emerging ISDN standards will mean in terms of new services and improved network performance, what holes still exist in the standards and trials, how to make smart buying decisions while keeping open your options for ISDN compatibility, and more. *Level:* Intermediate.

T-3 Strategic Planning for Corporate Information Networks

Leader: Dr. Howard Frank,
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Attend this tutorial to learn how to relate vendor offerings and technological trends to your organization's needs and requirements, and to develop a framework to plan future services and systems. You'll examine current issues in network integration, why communication departments must function as "mini telcos," and the pros and cons of software defined networks and private dedicated networks. *Level:* Introductory-Intermediate.

T-4 Planning and Designing Networks with the New Technology

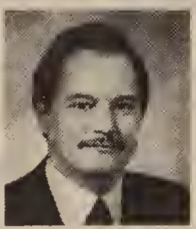
Leader: Dr. John M. McQuillan,
President, McQuillan Consulting

In this intensive seminar, you'll get acquainted with the key architectural principles used by today's leading network planners. You'll review emerging technologies such as T-1 networks, hybrids, VSATs, gateways between SNA, LANs and X.25, micro-mainframe links, and intercompany networks. You'll learn how to plan a corporate network using advanced technologies. *Level:* Advanced.

T-5 Building the Network Management and Technical Control Facility

Leader: Gabriel Kasperek,
President, Kazcom Inc.

This one-day course will help you understand the strategic value of network control, explore alternative technologies for managing your network, and discover how to evaluate current technologies for use in your own organization. You'll become familiar with the test equipment you need for successful network control, and understand industry trends and future directions. *Level:* Introductory–Intermediate.



T-6 Designing Voice and Data Networks Under the New Tariffs

Leader: Robert L. Ellis,
President, The ARIES Group Inc.

Take this tutorial to learn the structure of the post-divestiture tariffs, the latest January 1987 changes to these tariffs, how to price interstate private lines, how to configure and price interstate FX services, the new economics involved in configuring data networks, the LATA-pure strategy, and more. *Level:* Intermediate.

T-7 Managing the Telecommunications Resource

Leader: Gerald P. Ryan,
President and Founder,
Connections Telecommunications Inc.

This one-day course briefs you on how to develop a successful management environment. You'll learn what tools are available to do your job more professionally, how to plan a network management center, how to staff and train the department, and how to prepare and substantiate departmental budgets. *Level:* Intermediate.

T-8 IBM Token-Ring Versus Other LAN Choices

Leader: Dr. Kenneth J. Thurber,
President, Architecture Technology Inc.

This tutorial gives you an across-the-board overview of announced products, future plans, compatible products, and IBM's overall strategy with respect to Token-Ring technology. You'll discuss the Token-Ring's relationship to IEEE 802.5, the IBM cabling systems and hosts, get an in-depth look at NETBIOS and APPC/LU 6.2 interfaces, and more. *Level:* Intermediate.

T-9 VSAT Technology and Implementation

Leader: Dr. Jerome G. Lucas,
President, TeleStrategies

Learn the basics of applying very small aperture terminal (VSAT) satellite communications to your networking needs. You'll get acquainted with basic application requirements in SNA networking, data broadcasting, PC networking, video broadcasting, and teleconferencing. *Level:* Intermediate.

T-10 IBM's Systems Network Architecture (SNA): A Detailed Road Map

Leader: Daniel Zatyko,
President, Zatyko Associates

Enroll in this intensive one-day tutorial to understand the evolution of SNA, and learn fundamental SNA concepts—the seven SNA architectural layers, SNA's physical and logical addressing, strategic SNA products, components of NetView, Token-Ring networks, functionality and capabilities of the LU 6.2/APPC and NETBIOS interfaces, and more. *Level:* Intermediate.

T-11 An Introduction to Data Communications Today

Leader: Gary Audin,
President, Delphi Inc.

This course introduces you to the basic concepts, terminology and technology of data communications. You'll learn how various networks operate and how to select them; how best to interconnect computers, terminals, and PCs using different protocols; and what software is necessary to support protocols and network management. *Level:* Introductory.

T-12 Understanding the Communications Regulatory Environment

Leader: Richard E. Wiley,
Senior Partner,
Wiley, Rein & Fielding

Enroll in this tutorial to learn how telecommunications policy is made and changed, what agencies are active in policy making, how industry segments are affected by current policies, what key issues are now under consideration, and how you can influence future decisions. *Level:* Introductory

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NEW PRODUCTS

Sunlink adds MAP, TOP

Sun Microsystems, Inc. in Mountain View, Calif., has announced additions to its Sunlink family of data communications products.

The products include a Manufacturing Automation Protocol (MAP) implementation for connecting Sun workstations in factory environments and Digital Equipment Corp. Decnet compatibility for linking Sun systems to DEC computers. Also being announced are data communications products for the Defense Data Network (DDN) and support for the CCITT X.3 and X.29 networking standards.

The newest release of Sunlink OSI, which implements the first through the seventh layers of the Open Systems Interconnect (OSI) model, is said to support both Technical Office Protocol (TOP) and MAP.

MAP applications supported include MAP Common Application Service Elements, Network Management, Directory Services and File Transfer, Access and Management. It can be used with MAP 802.4 controllers, the vendor said, to link Sun workstations with the broadband token-bus layer in MAP environments.

Sunlink OSI for a TOP network only costs $2,500; for both TOP and MAP networks, it costs $3,000.

The Sunlink Digital Network Architecture (DNA) and the Sunlink VT100 Terminal Emulator products allow Sun users to interactively access and share files and resources with DEC systems on a Decnet network or over an asynchronous connection. Sunlink DNA can use Decnet protocols to communicate with DEC systems on the network. Sunlink DNA costs $1,200.

The Sunlink Terminal Emulator, a window-based software package, allows users to remotely access DEC systems through a window on the workstation display emulating a DEC VT100 terminal. Sunlink Terminal Emulator costs $500.

Sun expanded its offerings for access to packet-switched networks with Sunlink DDN and the addition of the X.29 and X.3 networking standards to its existing Sunlink X.25 product. Sunlink DDN costs $4,000, and Sunlink X.25 with the X.29 and X.3 software costs $2,500.

Aptec premieres IOC 200

Provides direct channel between I/O processors

Aptec Computer Systems, Inc. in Beaverton, Ore., has announced the I/O Computer System 200 (IOC 200), which is said to run at peak rates of 200M bit/sec.

The IOC 200 has an internal bus that routes traffic to and from attached devices such as disk and tape, array processors, general-purpose computers, telemetry systems, data acquisition equipment and custom devices.

According to a company spokesman, whatever the mix of attached devices, the IOC 200 dedicates an I/O processor to each device.

User-programmable I/O processors

The I/O processors are said to be user-programmable. They can handle data streams at rates as high as 12M bit/sec. while performing data manipulations concurrently.

The IOC 200 features a mechanism to allocate IOC 200 memory blocks to specific I/O processors; the I/O processors can read all memory, but only designated processors can write to certain memory locations, the vendor said.

Aptec's IOC 200

The IOC 200 also incorporates memory-based mechanisms for synchronizing communications between the I/O processors and provides a direct channel between the I/O processors.

The IOC 200 is compatible with the vendor's previous I/O computer, the Model 24, the spokesman said.

A typical configuration of the IOC 200 is priced at $200,000.

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C compiler is PC compatible

Computer Innovations, Inc. in Tinton Falls, N.J., has introduced a C compiler for personal computers called C86plus.

According to the vendor, the compiler takes advantage of hardware architectures such as Intel Corp.'s 80286 and 80386 microprocessors.

The compiler provides Microsoft Corp. Microsoft C code compatibility so that most existing applications written using Microsoft C can be recompiled under C86plus without changing the source code, the vendor said.

C86plus includes ANSI C library functions such as register variables for identifying critical data items; structure assignment for manipulation of complex data items; function prototypes for compile time checking and code generation; type modifiers such as const, volatile and signed; long double 80-bit floating point for floating-point numbers and trigonometric functions and enumerator data types.

Additional features include a library of more than 300 library functions, including AT&T Unix System V-compatible functions, Intel 8086, 186, 286 and 386 code generation options, in-line Intel 8087 and 287 floating point with automatic detect emulator and mixed model support including near and far type modifiers.

C86plus is priced at $497. It runs on the IBM Personal Computer XT, PC AT and compatibles hosting Microsoft MS-DOS and IBM PC-DOS Version 2.0 and above. A hard disk drive and 512K bytes of memory are required.

IBM

```
printf("Hello, world\n");
```

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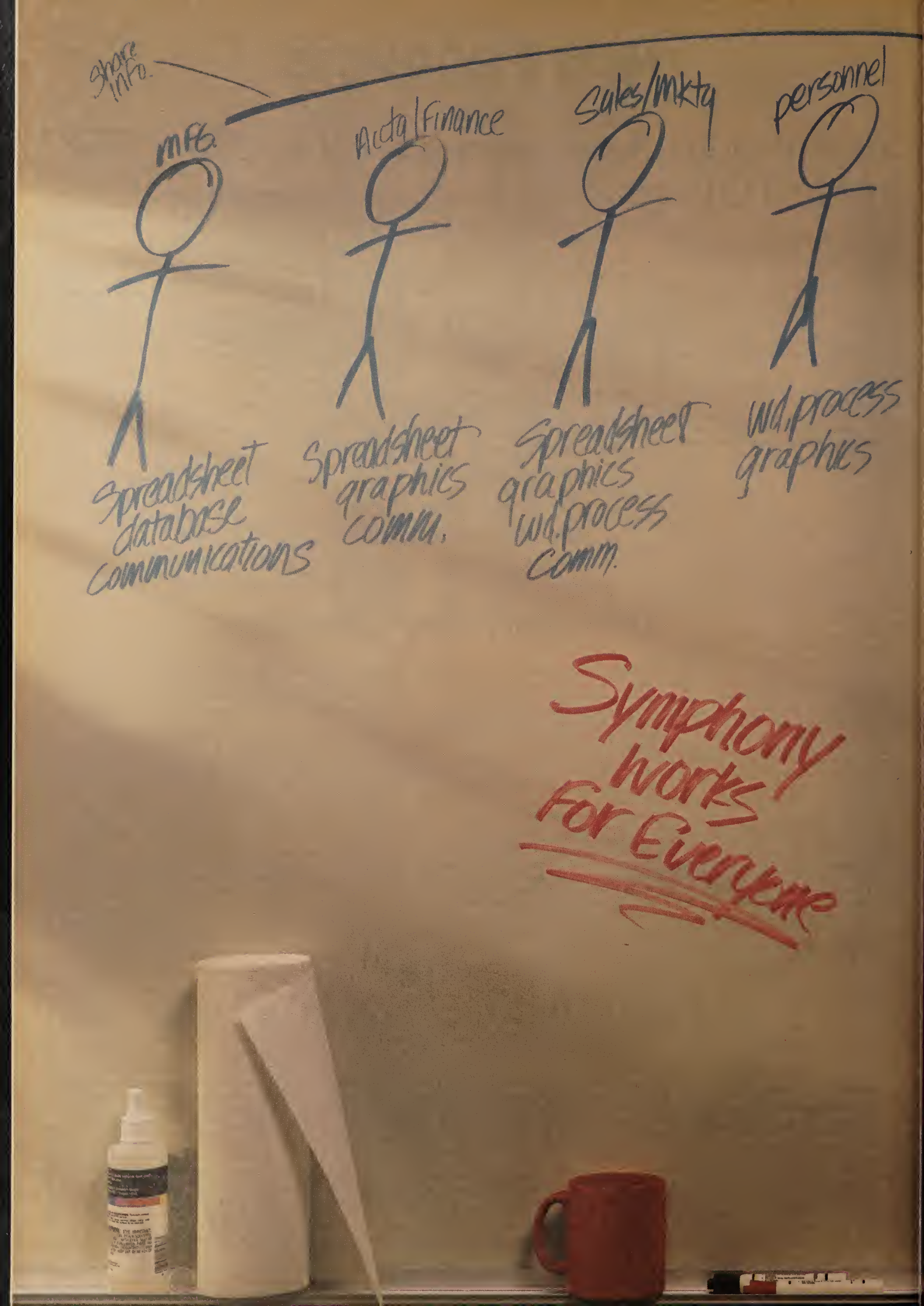
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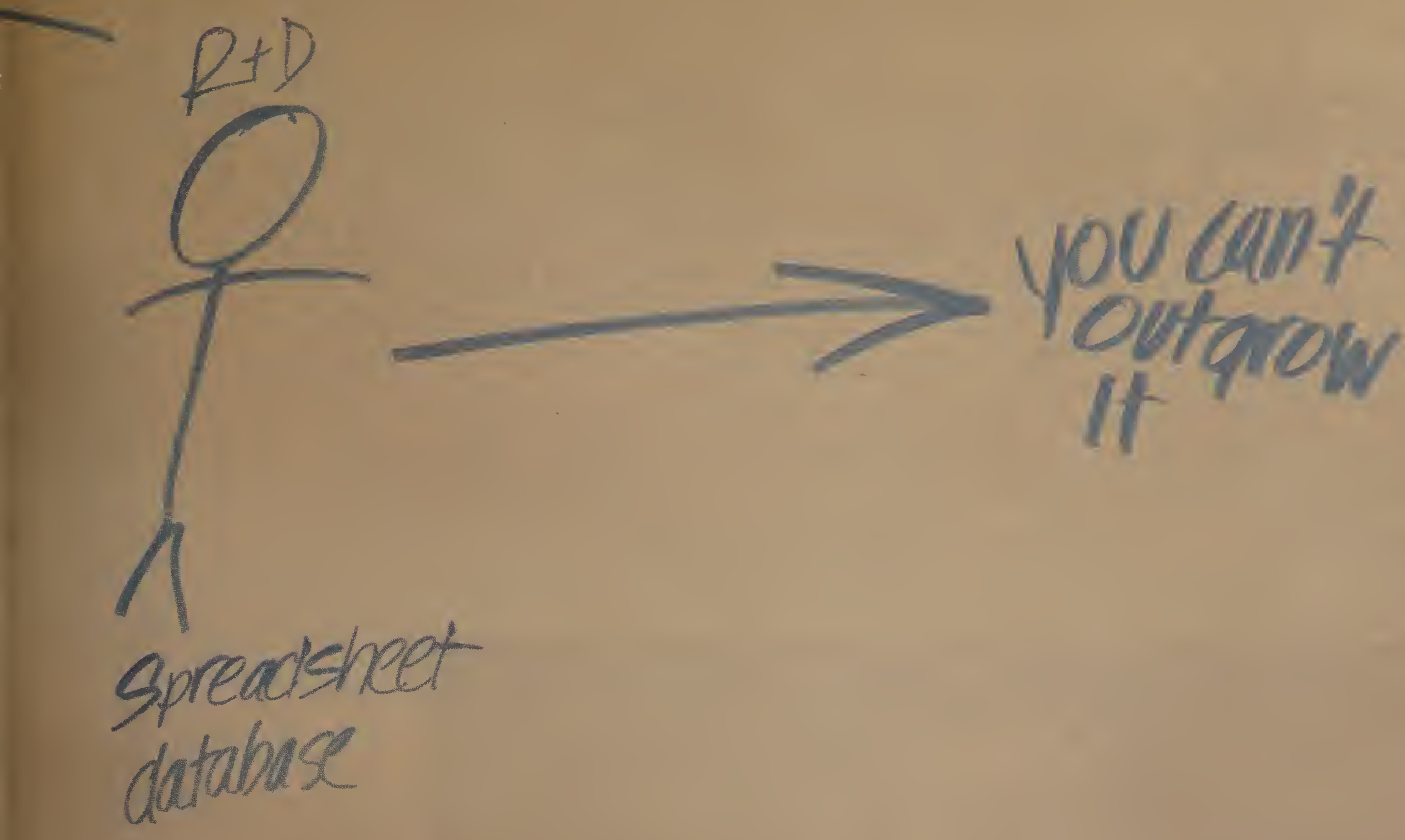

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SOFTWARE & SERVICES

Systems software

System Software Associates, Inc. has announced its **Sales Retrieval System** (SRS) for its Business Planning and Control System (BPCS) for IBM System/36 and 38 machines.

SRS is said to allow managers to design their own sales reporting systems using English commands. It then automatically accesses the BPCS data base to provide the information desired. A system can use up to 99 different sales variables.

The BPCS/SRS module costs $3,000.

System Software Associates, Suite 2850, 200 W. Madison, Chicago, Ill. 60606.

Automation Technology Products has announced its **Cimplex-Next** computer-aided design and manufacturing software for IBM mainframes.

Cimplex is said to include the accurate geometry, topology, tolerances, form features and administration data for parts control data types in a single integrated data base. It is also said to provide a method to avoid approximation errors in translating surface geometry from existing systems.

The complete Cimplex system includes applications for solids-based design, analysis, manufacturing and engineering change control.

Prices begin at $100,000. A mainframe-based system costs $375,000.

Automation Technology Products, 1671 Dell Ave., Campbell, Calif. 95008.

Leland, Inc. has announced the **Leland Customer Order Servicing** (LCOS) system and the **Leland Materials Requirements Planning** (LMRP) module for IBM 4300 and 3000 series mainframes.

LCOS contains modules for customer management, order management, shipping and invoicing. It is compatible with IBM's Communications-Oriented Production Information and Control System (COPICS) and Material Requirements Planning (MRP) data bases.

LMRP is a Cobol alteration to the COPICS MRP module. It includes all COPICS functionality.

LCOS costs $45,000. LMRP costs $30,000. Both use CICS and DL/1 and process in both OS/MVS and DOS/VSE.

Leland, Suite 626, 8601 Dunwoody Place, Atlanta, Ga. 30338.

Utilities

Bennett Software, Inc. has announced **Libtrac/ACM**, a change management tool for IBM MVS mainframe environments using TSO and ISPF.

The product is said to provide on-line programmer control of change requests, on-line authorization and library change audit for program, JCL, PROC or source library changes.

Features include network job entry central site support abilities and on-line change inquiry by various criteria.

A site license costs $16,500.

Bennett Software, P.O. Box 96694, Houston, Texas 77213.

■

Unipress Software, Inc. has announced a Unix-oriented text editor called **Vi-Plus**, an enhanced version of its Vi.

Vi-Plus is Vi compatible and includes enhancements such as multiple windows, an interactive interface to the Unix operating system and extensibility through macros and the MLISP extension language.

Vi-Plus is available for computer systems running Unix and Unix derivatives. It is priced from $645 to $3,995.

Unipress Software, 2025 Lincoln Highway, Edison, N.J. 08817.

■

Unipress Software, Inc. has announced **C-Macs**, a C language programmer's editor.

According to the vendor, C-Macs understands the C language. Features include the ability to run Make while an edit session is under way and collect any compiler error output in a window.

Other features include multiple windows for displaying several files simultaneously, shell windows for executing commands from within C-Macs, macro capability and the MLISP programming language.

C-Macs is available for systems running Unix and Unix derivatives. Prices range from $645 for personal computers and workstations to $3,995 for superminicomputers.

Unipress Software, 2025 Lincoln Highway, Edison, N.J. 08817.

Languages

Cosmic Software Information Services has announced **Clips**, a forward-chaining rule-based language for developing expert systems.

Clips is said to be based on the Rete algorithm, which enables efficient pattern matching. The collection of conditions and actions to be taken if the conditions are met are constructed into a rule network. Wild cards and variables are supports for both single and multiple fields.

Clips costs $200 for source code and $17 for the user manual.

Cosmic, The University of Georgia, Athens, Ga. 30602.

Training

Scientific Systems, Inc. has introduced **MAP-Facts Advanced Concepts**, the first in a series of computer-based training products for the Manufacturing Automation Protocol (MAP).

The software is said to provide in-

Continued on page 96

EDIT WITH POWER!

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Continued from page 94

teractive on-site training for factory automation personnel. It provides an overview of factory communications, from the seven-layer model for Open Systems Interconnect to implementation and performance information.

MAP-Facts Advanced Concepts runs on IBM Personal Computers and compatibles. It costs $595.

Scientific Systems, One Alewife Place, 35 Cambridge Park Drive, Cambridge, Mass. 02140.

MICROCOMPUTERS

Systems

NCR Corp. has announced the **3390 series** of personal computer-based workstations.

According to the vendor, configuration for varying applications is accomplished through a systems design that places the optional functions of the workstation on a single circuit board called a personality card. The cards are available in six versions, providing various workstation displays, disks, communications capabilities and memory sizes.

Prices range from $1,694 to $2,789.

NCR, Dayton, Ohio 45479.

■

Bondwell has announced the **Xpress 16**, an IBM-compatible home color computer said to feature audio and graphic capabilities.

The system includes 256K bytes of random-access memory, built-in disk drive, expansion ports, Microsoft Corp. MS-DOS and GW-Basic. Other features include a video display processor, three channels of sound with eight full octaves per channel, parallel printer, joystick and mouse peripheral ports, monochrome composite and red-green-blue video outputs and a 512- by 212-pixel resolution with 16-color output.

The Xpress 16 costs $499.

Bondwell, 3300 Seldon Court #10, Fremont, Calif. 94539.

Software applications packages

Spectrum Human Resource Systems Corp. has announced its **Executive Compensation Management System**.

The system is said to administer, monitor and report an unlimited number of plans, including all of a company's stock option plans, stock appreciation rights plans, bonus plans, performance unit plans and other executive and key-employee incentive and deferred compensation plans. It tracks multiple vesting formulas and various payout types, such as cash, stock or mixed forms and phased or deferred payouts.

The system runs on an IBM Personal Computer or compatible. It costs $12,500 for the single-user version and starts at $15,995 for up to four workstations.

Spectrum, Suite 300, 1625 Broadway, Denver, Colo. 80202.

■

ADS Associates, Inc. has introduced the **Working Capital Manager**, a financial information management system for IBM Personal Computers or compatibles.

The software is said to enable companies to determine their financial position and prepare cash forecasts by using an integrated set of four modules and 30 interlocking reports. It uses bank balances, cash calendar entries and accounts payable and receivable information to forecast future cash requirements and availability.

Working Capital Manager is priced at $1,500.

ADS Associates, Suite 200, 23586 Calabasas Road, Calabases, Calif. 91302.

Software languages

Mitrol, Inc. has announced **Mitrol-Micro**, a full-function fourth-generation language for IBM Personal Computer ATs and compatibles.

According to the vendor, applications written on the AT using Mitrol-Micro also run on an IBM mainframe that operates Mitrol under VM/CMS, OS/MVS or OS/MVS/XA. Features include extended network data model at the physical level, active data dictionary and data base definition.

Mitrol-Micro is priced from $3,000 to $25,000.

Mitrol, 800 W. Cummings Park, Woburn, Mass. 01801.

■

AVYX, Inc. has announced **Trees-PLS**, a programming language for IBM Personal Computer XTs, PC ATs and compatibles.

Trees-PLS is said to be a resource management tool that can be applied to many activity scheduling problems.

One feature is the product's ability to manipulate tree structures, which is said to be useful in artificial intelligence applications, according to the vendor.

Trees-PLS is priced at about $1,000.

AVYX, 265 Honeywell Center, 304 Inverness Way S., Englewood, Colo. 80112.

Software enhancements

Emerald Technology Group, Inc. has announced **Release 2.0** of its **PC/5251 Mate** and **PC/5251 Plus** remote terminal emulation software packages.

Release 2.0 of both products supports IBM's File Support utility, PC/Support 36 and 38 as well as the Emulation Transfer Utility software from Software Systems, Inc.

Features of Release 2.0 include up to five concurrent host sessions; 5224, 5225 and 5256 printer emulation; light-pen support and autokeystroke sequencing.

It also includes keyboard support for all IBM Personal Computers, Personal Computer XTs, ATs and compatibles.

PC/5251 Plus is priced at $750, the vendor said.

PC/5251 Mate at 2,400 bit/sec. costs $1,295, and PC/5251 Mate at 4.8K bit/sec costs $1,995, according to the vendor.

Emerald Technology Group, Suite 102, 1601 116th Ave. N.E., Bellevue, Wash. 98004.

■

Janus Associates has announced **Laser Print Plus** for the IBM RT Personal Computer, **Laser Print Extra** and **Laser Print Plus Version 3.04**.

Laser Print Plus for the IBM RT PC supports typesetting of text and graphics creation.

Text and graphics can be merged on the same page. Graphics include line and box drawing and 56 shades of graphics screens that can be rectangular, circular or oval.

The program costs $595, the vendor said.

Laser Print Extra runs on an IBM Personal Computer or compatible and provides typesetting of text with features such as margin setting, right justification, font changes and centering.

It supports graphics and the merging of text and graphics. Laser Print Extra costs $79.

Version 3.04 of Laser Print Plus for Micrososft Corp. MS-DOS and IBM PC-DOS features graphics support at 300 dot/in. resolution as well as graphics in both the portrait and landscape or rotated mode.

It is priced at $395, according to the vendor.

Janus Associates, 991 Massachusetts Ave., Cambridge, Mass. 02138.

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An important chapter deals with the techniques needed to optimize the performance of relational systems, and shows how to compromise the pure relational design when necessary. The comprehensive Reference section at the back of the book has a summary of each keyword and command; it serves as a quick memory aid while programming. Though the book is written in terms of the MS-DOS version, the portability of SQL/ORACLE means that the same programs can be used in a wide range of environments, including UNIX, VMS, MVS, and VM/CMS.

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- At @ type MAIL press CR.
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COMMUNICATIONS

Software

Conetic Systems, Inc. has announced **Higgins Exchange**, software said to link multiple local-area networks (LAN) into a single mail system.

Higgins Exchange extends the communications capabilities of the company's Higgins LAN work group productivity software. It can use its own asynchronous communications capability or a network's internetworking facility. One capability is automatic collection of lists of users and resources, eliminating the need for providing mail address, routing or physical location.

Higgins Exchange runs as a dedicated task on any personal computer on the network. It will also run as a background task within IBM Topview-compatible environments. It runs on networks that support Microsoft Corp. MS-DOS, IBM PC-DOS, MS-Net software and IBM Netbios.

The software costs $1,895.

Conetic Systems, 1470 Doolittle Drive, San Leandro, Calif. 94577.

■

Sterling Software has enhanced its **PC-Tracs 3270** batch data communication software to include support for multiple, concurrent mainframe sessions as well as the ability to route host print files to disk.

PC-Tracs 3270 emulates an IBM 3274 controller equipped with a 3278/9 terminal and a 3287 printer.

According to the vendor, PC-Tracs runs on any IBM Personal Computer, PC XT, PC AT or compatible and provides communication compatibility in an IBM Systems Network Architecture environment.

PC-Tracs 3270 costs $830, including software and Synchronous Data Link Control adapter.

Sterling Software, #199, 11050 White Rock Road, Rancho Cordova, Calif. 95670.

Multiplexers/Modems

Codenoll Technology Corp. has announced the **Codenet-3410** and **Computrol M-10F** modems.

The 10M bit/sec. fiber-optic modems were designed to operate with Manufacturing Automation Protocol. They operate with computers from Motorola, Inc., Intel Corp. and Industrial Networking, Inc. using the VME or Intel Multibus system buses. They are also available as a daughterboard that can be piggybacked onto a token-bus controller.

Each modem costs $1,750.

Codenoll Technology, 1086 N. Broadway, Yonkers, N.Y. 10701.

Fibermux Corp. has announced the **FX812**, a system for transporting T1 signals over fiber-optic cable.

It is said to multiplex up to eight T1 data streams over several miles of either single or multimode fiber-optic cable. It features adaptable clocking on each channel.

Three models are available for different distances and cost $3,000 to $10,000.

Fibermux, 21630 Lassen St., Chatsworth, Calif. 91311.

Test equipment

Telecommunications Techniques Corp. has unveiled **Model 40540**, a DS1/T1 data interface module for the Fireberd 6000.

It is said to enable the Fireberd to test signals with AMI or B8ZS coding, framed D4, ESF Fe or unframed data. The module costs $1,695.

Telecommunications Techniques, P.O. Box 6027, 444 N. Frederick Ave., Gaithersburg, Md. 20877.

Datacommunications Test Instruments has announced the **Line Activity Meter**, which measures line utilization in networks using bisynchronous or any bit-oriented protocol.

It is available with a V.35 or RS-232C interface and measures the instantaneous, average and peak line use. The RS-232C version is $349; the V.35 version is $399.

Datacommunications Test Instruments, 7666/1 Fulton Road, Springfield, Va. 22153.

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SYSTEMS & PERIPHERALS

CAD/CAM/CAE

Adra Systems, Inc. has introduced the **Adra 3000 CADD System**.

The Adra 3000 is a multifunctional, expandable industry-standard computer-aided design and drafting system, the vendor said. It features a 19-in. 1,024-pixel by 1,024-pixel color or monochrome display.

The system can be configured with a 10M-byte hard disk or with a 100M-byte hard disk with internal 45M-byte cartridge tape drive.

The Adra 3000 comes standard with 4M bytes of memory, which can be expanded to 12M bytes of memory.

The color Adra 3000 costs $18,750, and the monochrome Adra 3000 costs $14,750.

Adra Systems, 59 Technology Drive, Lowell, Mass. 01851.

■

Cognition, Inc. has introduced **The Mechanical Advantage 1500/GPX**, an integrated system for mechanical computer-aided engineering.

Based on Digital Equipment Corp.'s Vaxstation II/GPX, the product is said to allow the user to create an integrated engineering model.

The product includes the vendor's Optimizer family of software tools; a Cognition Application Engine Plus system, consisting of a DEC Microvax II, 5M bytes of memory, a 95M-byte streaming cartridge tape and two 71M-byte hard disks; and either one or two GPX Personal Engineering Workstations.

The Mechanical Advantage 1500/GPX costs $105,000 for a two-seat configuration.

Cognition, 900 Tech Park Drive, Billerica, Mass. 01821.

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Printers/Plotters

Western Graphtec, Inc. has announced the **PD111** A-to D-size pen plotter.

The plotter is a four-pen, servo motor driven, pinch roller pen plotter that handles four different size papers ranging from A through D. It has a maximum plotting speed of 18 in./sec. The unit features four self-capping pens available in a variety of types and colors.

Three different dual interfaces are available: Centronics Data Computer Corp., Centronics and RS-232 and Centronics and Institute of Electrical and Electronics Engineers interfaces. Two command languages are offered — Western Graphtec's GP-GL protocol and the Hewlett-Packard Co. HP-GL emulation commands.

The PD111 costs $5,200.

Western Graphtec, 12 Chrylser St., Irvine, Calif. 92718.

■

Versatec, Inc. has released the **Model 123** interface board for Digital Equipment Corp. PDP-11 and VAX Unibus systems.

The board was designed to enable users to interface Versatec's family of electrostatic color and monochrome plotters, thermal-transfer plotters and raster-processing machine controllers with DEC systems.

It conforms to DEC Unibus I/O architecture and is compatible with DEC's LP-11 line printer driver.

The Model 123 interface board costs $2,200.

Versatec, 2710 Walsh Ave., Santa Clara, Calif. 95051.

PRICE REDUCTIONS

Inmark Development Corp. has reduced the price of its **Market Maker** investment analysis software program.

The software, designed for the IBM Personal Computer, is said to allow investors to chart and perform technical analysis on stocks, futures and options. The integrated program includes communications, data management and graphics modules.

Market Maker costs $585.

Inmark Development, Suite 810, 139 Fulton, New York, N.Y. 10038.

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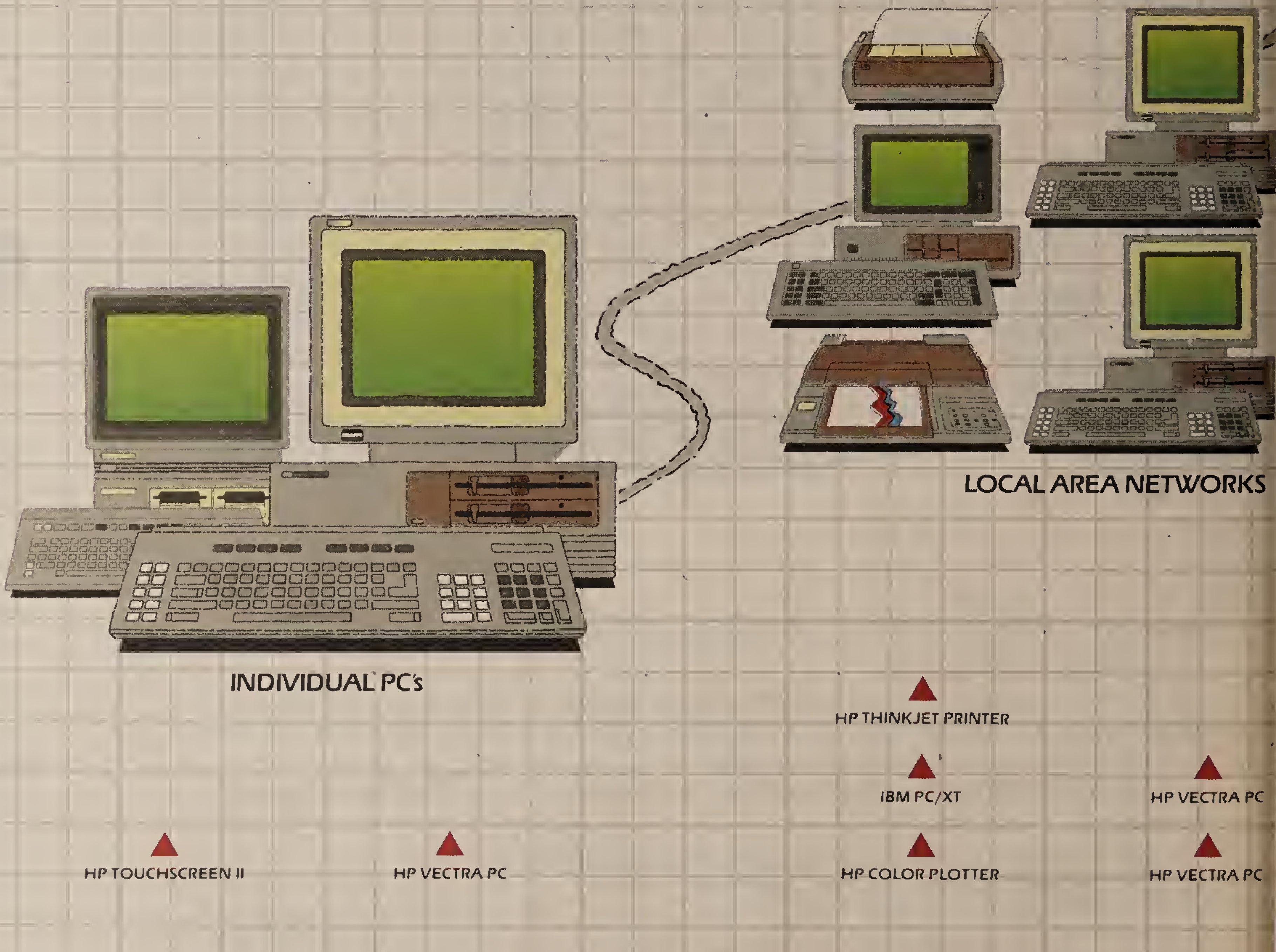

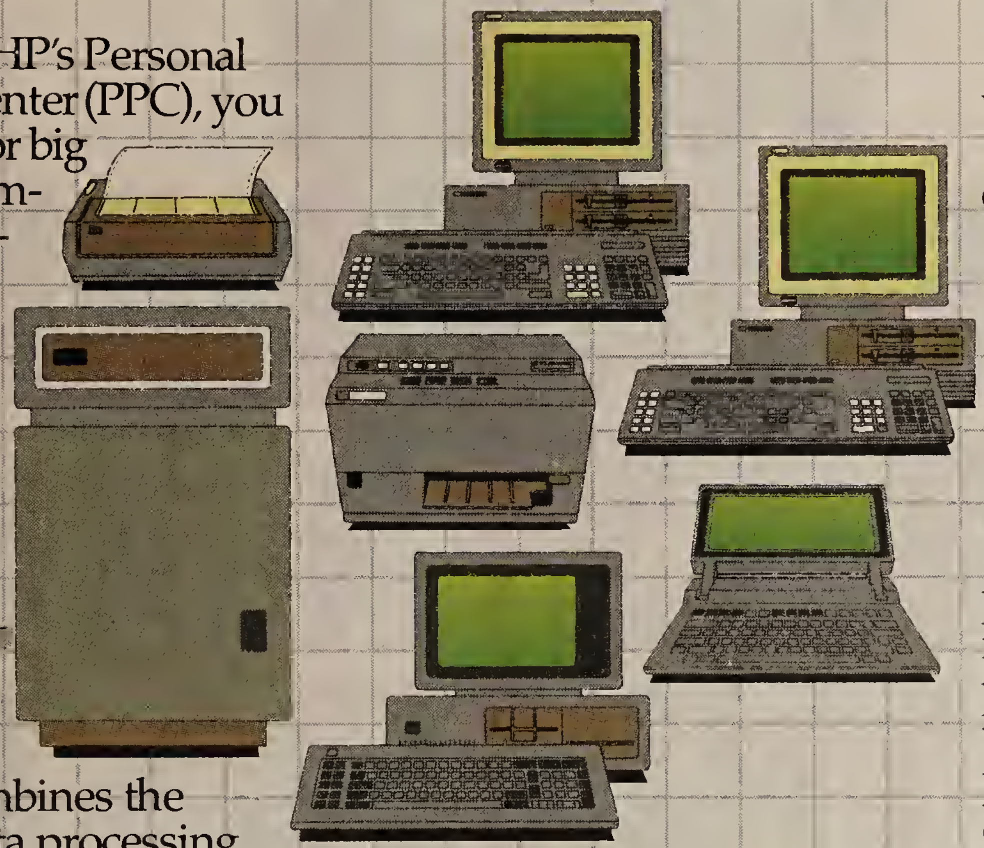

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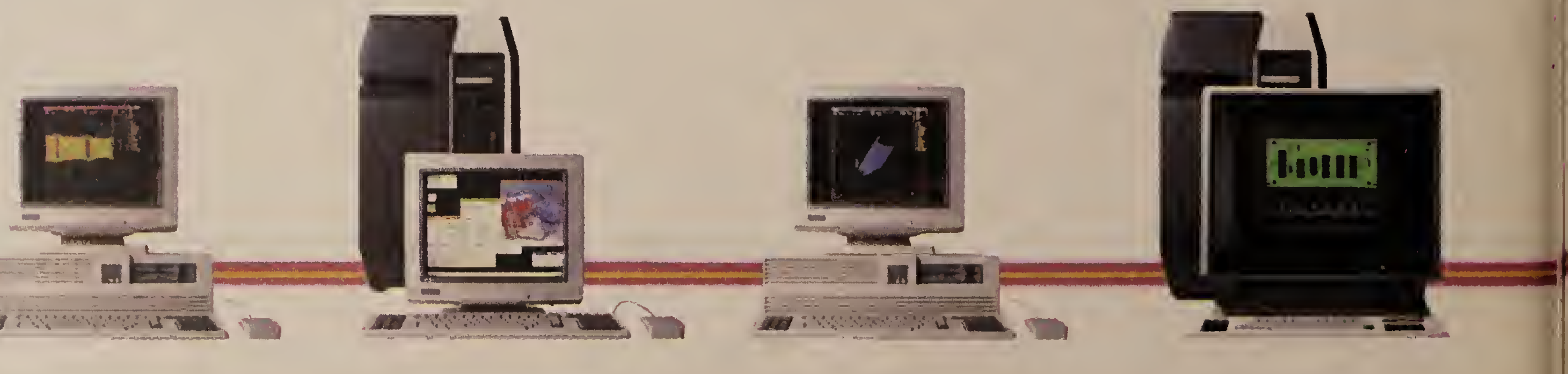

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COMPUTER INDUSTRY

Section begins on page 134

Nynex quietly prepares entrance to telecom software mart

Uses two subsidiaries to stimulate effort

By Alan Alper

NEW YORK — Almost three years after the breakup of AT&T, Nynex Corp. — the New York Telephone Co. and New England Telephone & Telegraph Co. regional holding telephone company — is quietly positioning itself as a player in the commercial telecommunications software market.

Current federal regulations, however, are forcing Nynex to attack the market from two vantage points. Subsidiary Nynex Service Co. is marketing telecommunications packages to the regional Bell operating companies as part of the firm's regulated business. Under its unregulated business activities, Nynex is marketing telecommunications software directly to end users through its Nynex Development Co. unit.

Nynex, like its fellow regional holding companies, is preparing for the day when the U.S. Department of Justice eases the restrictions that divide its activities into regulated and unregulated businesses.

Last January, Nynex Service began marketing internally developed telecommunications packages that could be used by the divested Bell operating companies and independent telephone companies. Some of the products are generic enough to be used by corporations outside the telephone arena as well.

Through Nynex Development, Nynex has acquired two telecommunications software vendors during the last 12 months: Telco Research Corp., a Nashville, Tenn., developer of telecommunications management systems, and Data Group Corp., a Burlington, Mass., provider of software to the field service industry.

Gerald Mayfield of telecommunications consulting firm DMW Group says Nynex is preparing an assault on the telecommunications software market once the regulatory barriers are lifted.

"We know that they've looked at the software market carefully in general and the telecommunications software market in particular," Mayfield says. "These guys are strategically building a product set in anticipation of regulatory relief so they can move to merge their business when they get the opportunity."

Nynex will not reveal its hand, however. Gad Selig, Nynex Development vice-president of business development and marketing, says that "it's certainly possible" that Nynex could combine its two software businesses if granted a waiver from the Justice Department. "It would be a business decision based on market conditions," Selig says.

The waiver may be coming soon, analysts say, following the release of the Huber Report, a Justice Department-mandated review of the domestic telecommunications business two years after divestiture. Analysts believe the Huber Report, which should be made public in the next few weeks, will recommend the relaxing of restrictions between the regional holding companies' regulated and unregulated businesses, which could allow holding companies like Nynex to manufacture and market their own hardware while combining their telecommunications software business into one entity.

Meanwhile, Nynex Development has been created to act as a "greenhouse" for the new businesses Nynex would like to enter, Selig explains. Nynex Service, on the other hand, is developing and marketing telecommunications software packages in three general categories: applications support, computer management and revenue enhancement.

Prior to divestiture, all of the regional holding companies pooled technology, and each developed an area of expertise, recalls Joe Scotti, a software sales manager with Nynex Service. After the breakup of AT&T, Nynex felt that it could leverage

See **NYNEX** page 113

Nynex's push into software

January 1984: AT&T divests of the seven regional holding companies, including Nynex, as part of the Second Computer Inquiry.

May 1985: Nynex forms Nynex Development Co. to manage the new businesses it wants to enter.

August 1985: Under a waiver from Computer Decision II, Nynex and Bell South are permitted to market software products and other "intellectual properties." Nynex Service Co., a jointly owned subsidiary of New York Telephone and New England Telephone, is established to market internally developed telecommunications software to other holding companies and independent telephone companies.

November 1985: Nynex Development acquires Data Group Corp. of Burlington, Mass., a developer of field service management software systems.

January 1986: Nynex Service kicks off marketing efforts and begins signing third-party distribution agreements.

April 1986: Nynex acquires Telco Research Corp., a Nashville developer of telecommunications management software.

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Japan plays win-win game by increasing foreign investments

OUTSIDE LINES
Karl Reed

The recent announcement that Fujitsu Ltd. has taken an 80% share of the pioneering semiconductor company Fairchild Semiconductor Corp. confirms my view that the Japanese are playing what is for them a win-win game.

The Fujitsu initiative, as well as the impending merger between Honeywell, Inc. and NEC Corp., follows a pattern of Japanese overseas investments made possible, in part, by the actions of Japan's trading partners, desperate to stem the tide of their Asian counterparts' economic success. It is important that the current moves be seen as a new phase in Japan's economic development, one made both necessary and possible by the gradual revaluation of the yen against other major currencies.

This currency movement was deliberately engineered by the U.S., which sought some method of stemming the flow of Japanese imports that did not involve trade restrictions. Unlike other western countries, the U.S. has historically clung to the theory of free trade. Its traditional efficiency in industry, as well as the complexity of its domestic markets, has made it difficult for foreigners to compete.

The very same industrial efficiency, coupled with massive investment capacity, allowed U.S. products and companies to easily penetrate foreign markets, which were pressed by the U.S. to adopt a free-trade position.

In the last 20 years, however, Japan has emerged as a major new component of the world economy. Freed from the burden of defense spending by conquerors who wished to limit the future military capability of their former World War II opponent and the economic ideology of the free market, the Japanese were able to reconstruct their economy after the war.

The Japanese "plan rational" approach to economic development allowed a very close degree of cooperation between government and industry. The government fostered new industries and guided those already in existence to ensure that there was some kind of total coordination and, as a result, growth. Like other countries, Japan also restricted the entry of foreign goods to ensure that industry had an adequate base from which to grow.

Almost all countries in the western economic sphere rejected this approach, and the results are clear. England, one of the best examples, was unable to take the steps necessary for the restructuring of its manufacturing base.

Japan's economic growth along with the effectiveness of its trading companies has created a situation in which the country is currently being pressured in a most undiplomatic fashion to open its doors to foreign goods. Senior officials from the U.S. make threatening speeches and summon their counterparts to meetings and negotiations aimed at forcing the door open.

Viewed from Japan, the U.S. negotiating style is totally inappropriate, and even frightening, to any observer with a knowledge of Japanese history and tradition.

More important, it is totally counterproductive.

Most foreign observers would not be aware that Japan is facing negative inflation. The cost of living has dropped by a fraction of a percent during the past year, and the Japanese people would like this to continue to increase their living standards. An influx of cheap foreign goods would allow this through negative inflation.

However, the Japanese economy as a whole would suffer — *unless* the goods were produced by foreign subsidiaries of Japanese companies.

The answer is obvious. Japan will increase its investment in other countries, import its own products — and win all around.

One can expect, therefore, that the initial, tentative moves in this direction will accelerate during the next few years. The investments will include technologically based areas such as the computer industry, in which Japan is still struggling to achieve the level of sophistication of the West.

One would not be surprised to see Control Data Corp. or NCR Corp. — or even one of the smaller peripheral suppliers — absorbed.

While giving little trade support to its private sector, the U.S. government continues to argue for free trade in a climate where many countries are increasingly feeling the need to promote their own industries.

Reed, consultant editor to Computerworld Australia, *is currently visiting faculty research associate in the Department of Computer Science at the University of Maryland. He is on leave from Australia's Royal Melbourne Institute of Technology, where he is senior lecturer and area leader for software engineering in the Department of Computing.*

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IBM wins contract from Japanese NLI

Delivers processors to top life insurance seller

By Takehisa Kondoh

OSAKA, Japan — Consolidating its strength in the Japanese financial market, IBM will be delivering 6,700 mid-range office processors and workstations to Nippon Life Insurance Co. (NLI), based here.

The order, recently won from NLI, Japan's top life insurance seller, consisted of 1,700 System/36 processors and 5,000 units of IBM Japan's proprietary 5540 series multitasking workstations.

Big Blue's Japanese subsidiary declined to comment on the value of the deal, but sources said the IBM machines constitute a dominant part of NLI's 70 billion yen ($434.8 million) nationwide computerization project, called System 100. For the System 100 project, IBM reportedly worked with NLI from the initial stages in 1984.

NLI, a 97-year-old firm with 1985 revenue of 3.3 trillion yen ($20.5 billion) and total assets of 14.01 trillion yen ($87 billion), embarked in September on a comprehensive two-year distributed processing project.

By January 1988, about 2,000 branches and offices across Japan will be hooked into the Osaka headquarters.

IBM Japan spokesmen said the NLI system would operate in a fully integrated IBM Systems Network Architecture LU6.2 environment.

Kondoh is Asian bureau chief for the CW Communications International News Service.

MERGERS AND ACQUISITIONS

Reynolds Co. announced it has signed a letter of intent to purchase privately held **National Medical Computer Systems, Inc.**

National Medical, headquartered in San Diego, has annual sales of approximately $17 million and sells computer systems primarily to hospital-based physicians such as radiologists, anesthesiologists and pathologists.

The company employs 250 people and has a nationwide customer base.

Terms of the purchase agreement were not disclosed.

■

Business Software Technology, Inc., a developer of systems software products designed to manage and automate change control in IBM mainframe environments, announced that it has acquired the assets of **Condor Technology, Inc.**, including the firm's change management and control product for the IBM MVS environment, Control-1.

Established in 1982, Condor Technology is a New York-based manufacturer of systems software products for the IBM mainframe market.

■

Sharedata, Inc. announced it has signed a definitive agreement to acquire **Metasoft Corp.**, a developer and marketer of interactive business software for personal computers and office automation applications.

Upon closing of the transaction, Metasoft will become a wholly owned subsidiary of Sharedata by exchanging 100% of its outstanding common stock for 500,000 shares of Sharedata common stock.

■

VLSI Technology, Inc. and **Visic, Inc.** announced signing of a letter of intent whereby VLSI will acquire majority ownership of Visic.

Operating as a subsidiary of VLSI, Visic will have its own board of directors, which will include representatives from both Visic and VLSI. Products designed and developed by Visic will be manufactured in the VLSI technology facility and marketed under the VLSI name.

System imports rise 30% during first half of '86

WASHINGTON, D.C. — Due to increased Japanese exports, U.S. computer system imports rose 30% during the first half of 1986.

The rise caused the trade deficit in DP equipment to quadruple to $976 million from last year's rate of $234 million, according to the U.S. International Trade Commission.

Overall, data processing imports rose to $2.52 billion from $1.94 billion for the six months, and exports dropped 9% to $1.54 billion from $1.7 billion.

During the second quarter, U.S. imports increased 33% to $1.23 billion.

Exports in the same period were down 2% to $793 million.

Japan accounted for 47% of the imports during that period and Taiwan for 13%.

Broken down by product types, second-quarter imports included $436 million in systems, $385 million in printers, $229 million in terminals, $44 million in floppy disk drives, $47 million in hard disk drives, $28 million in other storage units, $7 million in keyboards and $45 million in miscellaneous devices.

This report originated with the CW Communications International News Service.

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The AT&T Model 4000 is a desktop modem designed for the AT&T PC 6300, all IBM*-compatible PCs, and most asynchronous terminals and printers. It sends and receives data over standard telephone lines at speeds of 300 and 1200 bps.

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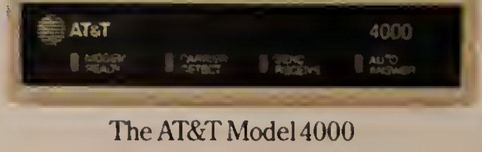
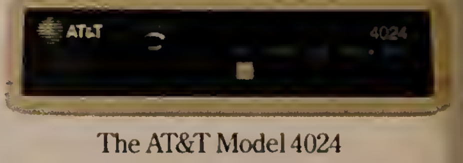


The AT&T Model 4000



The AT&T Model 4024

SUPERSHORTS

National Advanced Systems Corp. (NAS), which has been aggressively pursuing the third-party maintenance market, recently announced its entry into the leasing business. Parent National Semiconductor Corp. formed National Systems Finance Co. (NSF), a subsidiary that will write leases on NAS mainframes and Datachecker point-of-sale equipment.

A spokesman said that NAS hopes to convert 20% to 40% of its installed base to leases. NAS users with current leases acquired through third-party lessors will not be affected, although NSF will compete with those lessors for new business.

■

National Semiconductor Corp. recently filed a lawsuit against a Taiwan semiconductor chip manufacturer that allegedly developed a communications microprocessor using National's proprietary technology.

The suit, filed in California Superior Court, seeks to obtain a permanent restraining order against the marketing of a universal asynchronous receiver-transmitter chip by NMC Corp. in Santa Clara, Calif., and its Taiwan-based parent company, **United Microelectronics Corp.**

The suit is the latest effort by National to halt United and NMC's marketing of such a chip and comes two months after a district court in Taiwan issued a temporary restraining order against United. The order has since been lifted, pending hearings for a permanent injunction.

■

Teradata Corp., the Los Angeles supplier of data base computers, has restructured its operations to reflect the firm's increased international sales activities and emphasis on distribution channels. Marketing Operations Vice-President Jerry Modes was named vice-president of international operations. Boyd Pearce, who was vice-president of sales, was named vice-president of marketing and alternate distribution sales.

■

Commodore Semiconductor Group in Norristown, Pa., a division of Commodore Business Machines, Inc., announced it has re-entered the commercial semiconductor market after four years, offering its semiconductor manufacturing capabilities and products developed for the Commodore systems to independent vendors.

■

MAI Basic Four, Inc. in Tustin, Calif., announced the establishment of Tekserv, an international computer maintenance organization that will provide third-party maintenance and services to systems end users.

Tekserv will begin operations in western Europe through wholly owned subsidiaries of MAI Basic Four. The new company will assume MAI Basic Four's existing European maintenance operations.

■

Control Data Corp. in Minneapolis and **Wicat Systems, Inc.** announced plans to terminate their joint venture, Plato/Wicat Systems Co. by the end of 1986.

The joint venture was formed in February 1985 to market educational computer systems to kindergarten through 12th grade public and private schools in the U.S.

■

A federal lawsuit seeking to prevent the unlicensed marketing and distribution of a "Pick-like" software product by Ever-On Corp. has been filed by **Pick Systems.**

William R. Mitchell, Pick general counsel, said Ever-On is marketing a software product that operates on Tandem Computers, Inc. computers, enabling the use of Pick applications programs. The suit contends that the portion of Ever-On's software systems that enables the running of Pick applications, including certain utilities, constitutes actionable use of Pick's proprietary information.

■

Chips and Technologies, Inc. in Milpitas, Calif., announced that the company has signed a five-year agreement with **National Semiconductor Corp.** under which National will manufacture various current and future Chips and Technologies integrated circuits.

The agreement provides Chips and Technologies with access to additional high-volume CMOS manufacturing capacity for the company's gate array, standard cell and full-custom products.

Financial terms of the agreement were not disclosed.

Nynex prepares for software debut

From page 108

its software development aptitude into a business opportunity, he says.

Nynex is counting on incremental revenue growth from the 1,500 independent phone companies and the regional operating companies, which previously relied on AT&T and Bell Communications Research Corp. (Bellcore) to serve their software needs. "Many of the operating companies are more apt to buy technology rather than develop it, because it's more cost effective," notes Marie White, a software sales manager for Nynex Service.

Nynex is hoping to cash in on the confusion in the marketplace, DMW's Mayfield notes. "They hope to replace systems previously supplied by Bellcore and AT&T, which have some $700 million in systems in place," he says. Under present law, Nynex Service can sell software but cannot service it.

Nynex has contracted with five distributors to address both telephone company and other applications. Since the distributors are not encumbered by federal regulations, they can sell Nynex products to whomever they wish.

"Four-fifths of our packages are telephone company specific, but some are generic enough to be sold by the distributors to other users," Nynex's Scotti says.

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EXECUTIVE CORNER

Richard H. Lussier has been appointed chairman, president and chief executive officer of Pyramid Technology Corp. in Mountain View, Calif. Lussier replaces David Crockett, who resigned. Lussier, who has also been appointed to the board of directors, previously served as CEO of Verticom, Inc.

■

David A. Simpson has resigned as vice-chairman of Gould, Inc. Simpson, who held the position since July 1984, served as Gould president and chief operating officer from 1980 to 1984. He joined the company in 1976 as managing director of Gould Hovance Ltd. UK.

■

Russell F. Henke has been appointed president and chief executive officer of Automation Technology Products (ATP) in San Jose, Calif. Prior to joining ATP, Henke served as president and general manager of Gould, Inc.'s Imaging & Graphics Division.

■

Verdix Corp. announced the election of **E. Gary Clark** as president and chief operating officer.

■

Brian E. Sear has been appointed to the newly created position of chief operating officer at Symbolics, Inc. in Concord, Mass. Sear was also appointed president by the board of directors following the firm's meeting of shareholders, held Nov. 13.

■

Nathan Gamble has been named director of management information services for Sentinel Computer Services in Oak Brook, Ill.

■

Seagate Technology Corp. in Scotts Valley, Calif., elected two corporate vice-presidents. **Ken Wing** is now vice-president of product assurance and reliability, and **Ken Hardesty** is vice-president of corporate development.

■

Sorbus, Inc. announced changes in the independent maintenance company's headquarters management structure. **John T. Valentino** has been named senior vice-president of operations, replacing **Michael B. Chamberlain.**

Chamberlain was recently named vice-president of operations for the Bell Atlantic Enterprises customer services group.

■

Garrett A. Johnson has been appointed to the position of vice-president of research and technology at Control Data Corp.'s Data Storage Products Group.

■

Alpine Datasystems, Inc. announced that **H. Steven Crouch** has been named president and chief executive officer of the company, and **Gregory Fry** has been named vice-president.

■

T. Scott Mitchell has been named president of the Data Management Services Division of Moore Business Forms, Inc. Mitchell replaces **Louis J. Rupnik**, who has been promoted to vice-president/chief development officer of parent company Moore Corp. in Toronto.

Fred Wang: Can he do it?

From page 134

red in the quarter ended Sept. 30. In addition to the sluggish computer market, Wang Labs is also saddled with loss-plagued Intecom, Inc.

2. Assuage a skeptical Wall Street community regarding the above.

3. Galvanize, motivate and direct a marketing unit that has been through several iterations since J. Carl Masi Jr.'s departure. Fred Wang took the most recent step during his first day on the job, passing the marketing ball to European sales whiz kid Ian Diery and shifting veteran Bob Doretti to a new corporate communications post. Wang and Doretti denied that the move represented a demotion for Doretti, but the Wang family clearly wanted new blood in the position.

4. Assure customers about Wang Labs' much-maligned service and support.

5. Finally succeed in reaching the firm's oft-repeated goal: To make the transition from a highly profitable word processing provider to a successful data processing vendor.

It is impossible to overstate the magnitude of the latter challenge. But many feel that the Doctor, as revered as he is, was not the best man to step back in and rebuild the company's day-to-day operations.

The competitive marketplace in which Wang Labs plays today is a very different place from the arena in which the company carved out the office automation market for itself. Now, a whole host of players is after the same market. There was a time when Wang's rivals began and ended with IBM. Not anymore.

Fred Wang believes he is the right man for the job. He certainly knows the company from top to bottom. But of course, that is no guarantee of success in running the whole show.

It is doubtful that Wang Labs can ever return to its breathtaking growth rates of the 1960s and 1970s, but that is an unrealistic goal for Fred Wang, or anyone, to shoot for. If the company can prosper modestly while growing and serving its customer base in the now cutthroat worlds of office automation and departmental processing, Fred Wang will deserve a lot of credit. But the company still has a long way to go.

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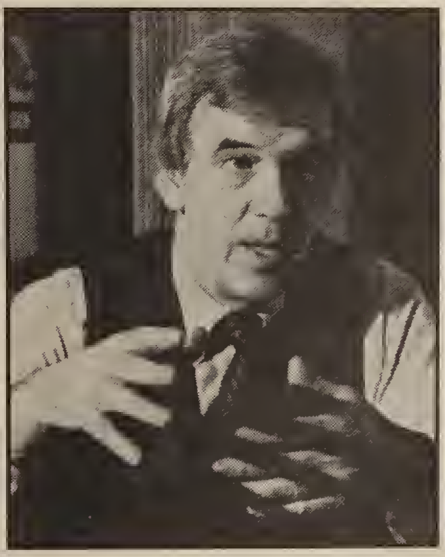

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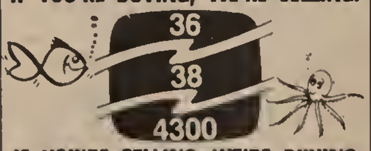

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Request for Proposal No. 1179, due Wednesday, December 17, 1986 at 3:30 p.m. for the acquisition of maintenance services for AT&T microcomputer and peripheral equipment for the STATE DEPARTMENT OF EDUCATION.

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- Jan 12 - **Capacity Planning**
- Feb 9 - **State-of-the-art data centers**
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Product Spotlights

- Jan 19 - **Terminals**
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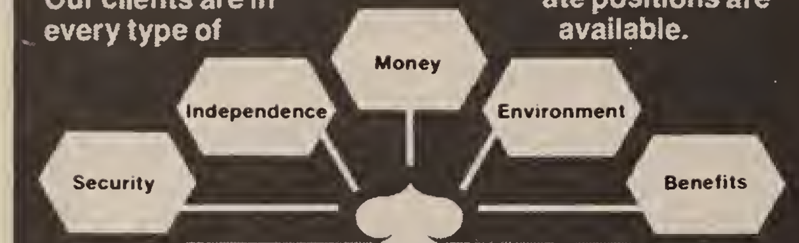

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To apply, send two copies of resume to Sally Hansen, MIT Personnel Office, E19-239, 77 Massachusetts Avenue, Cambridge, MA 02139. Please refer to job number A86-847.

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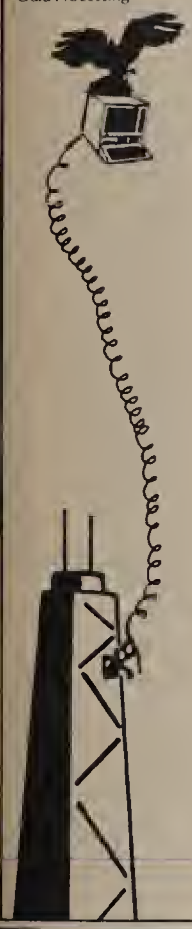

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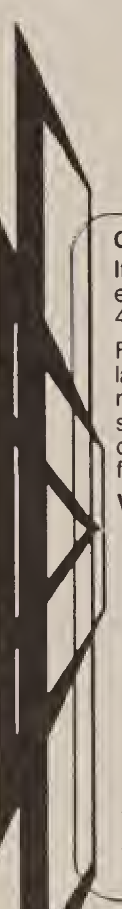

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Modem firms fight Hayes

From page 134

cover an obscure part of the modem. This situation is comparable to the man who invented door locks for cars announcing that he also invented the automobile."

It is not clear what action, if any, the modem industry might ultimately attempt in fighting Hayes or Bizcomp. Ven-Tel, Inc. and other vendors have shown interest in rallying the industry to provide funds for U.S. Robotics' and Prometheus's suit against Bizcomp, but there had been no formal intentions expressed at press time last week.

Meanwhile, both Bizcomp and Hayes have elected to stand by their patents and policies.

"Regardless of the outcome of anything they talk about, the key thing here is that our patent was just recertified by a branch of the federal government that doesn't do such things lightly," said Philip Sacino, national sales manager for Bizcomp.

Hayes President Dennis C. Hayes said earlier that the royalty fees were developed in order to protect Hayes's research, not to destroy the competition.

There is some hope in the industry that a collective effort voicing strong opposition could eventually cause the Hayes and Bizcomp patents to be dismissed as invalid.

"When a patent is applied for and granted," the representative said, "the scrutiny by the patent office is not always as stringent as it is when someone is fighting that patent, which is the situation now."

GM sale attempt seen as cost cutter

From page 134

two years ago for $2.5 billion. EDS's founder and chairman, H. Ross Perot, who is GM's largest shareholder, has publicly criticized the auto maker's management style and bureaucratic business ways.

EDS, moreover, has been stifled in its attempts to get GM to restructure the Class E stock it issued to finance the purchase of the company, analysts added. Class E shares do not represent ownership of GM but entitle holders to a dividend based on EDS's profits.

"This may not have started out as a way to shop EDS and it may not end up that way, but GM would like to find a way to sell a piece of the company," noted Osman Eralp, an analyst with Hambrecht & Quist, Inc. in New York.

"GM is looking to satisfy EDS's management, which wants some freedom and wants to refinance the stock," Eralp continued. "It's a situation that is likely to be visited time and again."

Other analysts said it would be difficult for GM to find another firm partner for EDS because of EDS's dependence on its parent. Approximately 75% of EDS revenue emanates from GM data processing projects. EDS had revenue of approximately $1 billion in the third quarter.

According to a published report, GM and AT&T discussed a variety of purchase arrangements during a two-month span that ended in early November. Initially, GM proposed to sell 25% of EDS stock to AT&T, keep 25% for itself and offer the remaining shares to the public. It is believed that AT&T offered to buy EDS outright for between $5 billion and $6 billion.

According to the report, the talks ended when the two sides could not agree on a price. GM valued EDS at approximately $6 billion, a figure that analysts said would have been more than AT&T, or almost any other corporation, could digest.

GM issued a terse statement last week refusing to confirm or deny the alleged negotiations with AT&T. "EDS is not for sale. There are no discussions concerning such action, and beyond that there is nothing to say," a GM spokesman said.

For its part, AT&T confirmed that the two firms had discussed a variety of business relationships. "The parties have talked about how best to approach the business market, and those talks included a wide range of options that didn't preclude investment," an AT&T spokesman said.

AT&T and EDS have cooperated on a number of contracts during the last two years, AT&T said. EDS has also developed a billing system for AT&T, the firm added.

Seattle fights for DOS rights

From page 134

of Seattle Computer, estimates Microsoft charges at $60,000 for 1,000 units for a one-year contract and that this contract does not include source code.

Brock indicated his willingness to sell the operating system license outright for $100,000.

Also in court documents, Microsoft points to the original contract with Seattle Computer that allows the company to license MS-DOS only with its own hardware based on the Intel Corp. 8086, the microprocessor in the 5-year-old basic version of the IBM PC.

Seattle Computer's request for some $60 million in damages is based partly on Microsoft's profits for licensing MS-DOS for the past five years. This request was separated as a legal issue to be decided in June 1987, according to Superior Court records.

Legal wrangling

Much of the legal wrangling since the suit was filed last February has involved Seattle Computer's requests for internal Microsoft correspondence and records regarding MS-DOS development.

Microsoft has refused. The company claims the need to protect proprietary technology.

Shellan is reviewing those documents in his chambers in order to make a ruling on their admission as evidence.

AT&T rises from slumber with eye on regulatory relief

ACTIVE ISSUES
Kathy Porteus

For most of 1986, as the overall stock market rose by 20%, AT&T's stock lay dormant in the $22 to $25 price range. But early last week, the communications giant was waking up investors as its common stock topped $27, establishing a new 52-week high.

Until last week, AT&T's stock (T—27⅛) seemed immune to news of the firm's corporate restructuring, cost cutting and computer product repositioning. Such developments do not immediately translate into significant earnings improvements, which normally drive the stock.

According to Jack Grubman, securities analyst with Paine Webber, Inc., AT&T would need $100 million in net profit to add just 10 cents per share in earnings, given the company's current margins and enormous capitalization, with more than one billion shares outstanding. "This would require an additional $2 billion in sales," Grubman says, "and I don't see that happening."

Although earnings-per-share estimates for AT&T remained unchanged last week, what did change was investors' perception of AT&T's outlook. "What's happening now is that investor psychology has taken over," says Lap Lee, of Wertheim & Co. "People always try to catch up if they believe they are missing a good story."

According to Lee, an important factor in AT&T's recent stock move is the sign that the major long-distance carrier may get some regulatory relief. "There are perceptions that we are moving in that direction," Lee says, "even though earnings would not be affected for a year or two."

Federal regulation now limits the rate of return AT&T can achieve by providing long-distance services. As a result of regulation and possible additional loss of market share, AT&T's earnings from long-distance services will likely deteriorate 15 to 20 cents per share in 1987, Paine Webber's Grubman believes.

Other factors reflected in AT&T's stock performance include the firm's extensive cost cutting and revamping of its computer strategy.

After racking up sizable losses since divestiture, AT&T's computer business will become part of the company's core communications equipment and long-distance businesses. The price of executing this new strategy is a merging of two divisions and the layoff of thousands, thus triggering reports of low morale among workers. Lee says he expects the issue of poor morale in AT&T's sales force to continue for at least another two months.

Grubman estimates AT&T will earn $1.85 per share in the next fiscal year, which ends Dec. 31, 1987. This assumes AT&T will benefit from a $1 billion cost improvement, owing to layoffs of 25,000 workers. He estimates AT&T will earn $1.70 per share this year.

Grubman says he will not recommend purchase of AT&T stock until he sees some fundamental growth emerging from its business. According to Grubman, AT&T's highly publicized restructuring only mitigates what would otherwise be a downward slide in earnings. He does recommend that current holders of AT&T stock continue their position.

Wertheim's Lee estimates AT&T will earn $2 per share in 1987 and projects $2.50 per share in 1988. This projection assumes $1.50 per share from long distance services and $2 billion in cost savings. "Expecting a price-per-share range of $30 to $35 before too long is not at all unreasonable," Lee says.

Porteus is president of Strand Research Associates, a Centerville, Mass.-based company that provides customized research services for financial and high-tech firms.

Unisys groups sales, marketing

Staffs officially united along four industry lines

By Alan Alper
and Clinton Wilder

DETROIT — Unisys Corp., the merged Burroughs Corp. and Sperry Corp., last week officially combined Burroughs' and Sperry's U.S. sales and marketing activities along four industry lines.

Combined Burroughs-Sperry sales forces will sell through four units targeting telephone companies, airlines and hotels; banks, financial services and insurance firms; government, education, medical and utilities customers; and manufacturing and retail businesses.

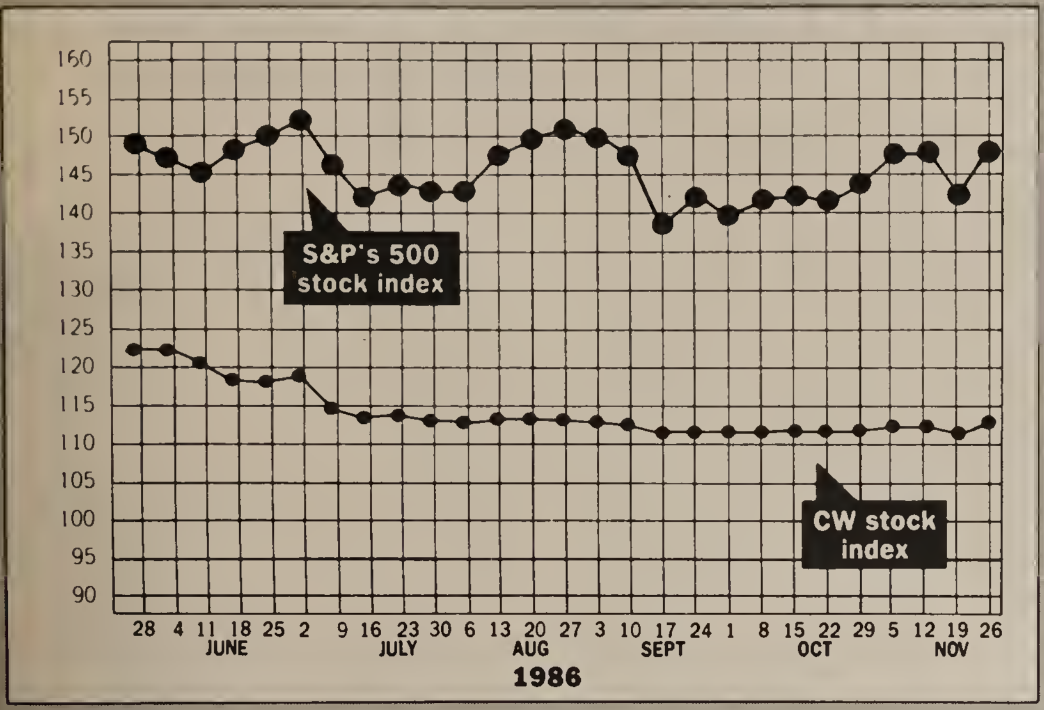
Unisys Vice-Chairman Joseph Kroger said the combined sales forces will "maintain our absolute commitment of continuity of service to the Burroughs and Sperry customer base."

Separately, Unisys agreed to sell its International Business Forms and Supplies division to the unit's management and an investment company for approximately $53 million in cash and subordinated notes.

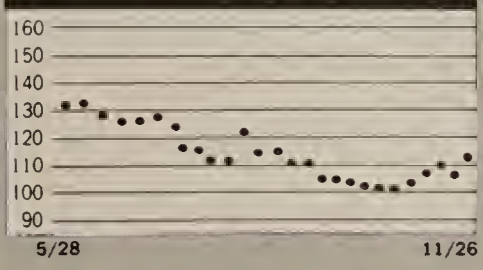
The unit, which markets business forms and office supplies, will be renamed NU-Kote International and will be headquartered in Rochester, N.Y. The company is expected to have annual sales of about $150 million and 1,300 employees.

COMPUTER INDUSTRY

Computerworld stock trading index



Computer systems



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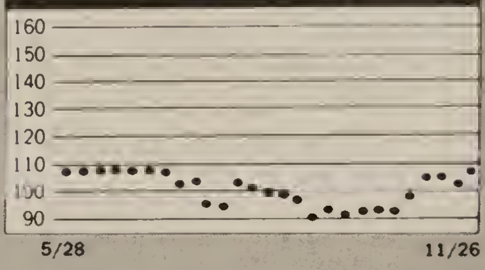

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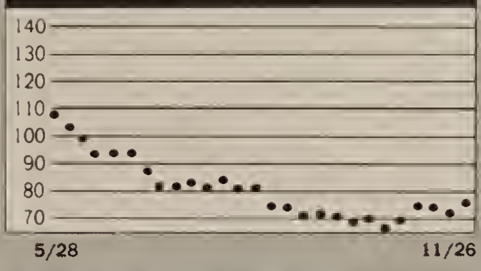
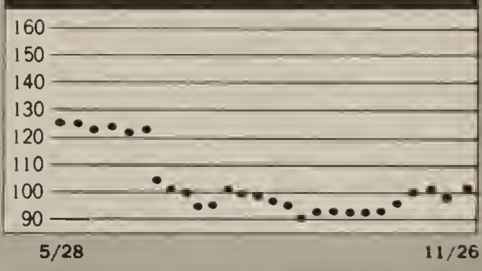
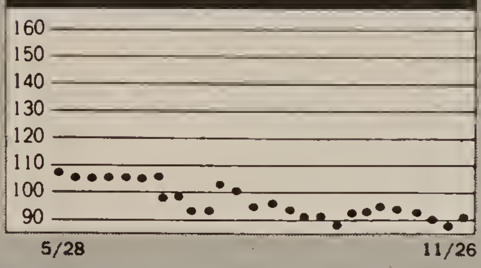


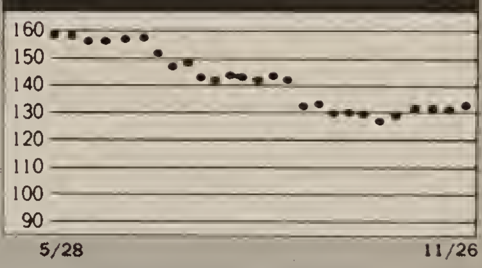
Peripherals and subsystems



Leasing companies



Supplies and accessories



All indexes reflect a historical base of 100 on Dec. 31, 1984, and trace stock market performance in relation to that base. The CW stock index represents the unweighted average performance of the six categories of computer industry stocks.

	11/19/86	11/26/86
Computer systems	107.1	**113.0**
Software and DP services	103.4	**107.2**
Peripherals and subsystems	99.6	**101.2**
Supplies and accessories	131.4	**133.5**
Semiconductors	71.3	**76.1**
Leasing companies	89.3	**90.7**
CW stock index	111.5	**112.2**
Standard and Poor's 500 stock index	142.1	**148.4**

Computerworld stock trading index

CLOSING PRICES WEDNESDAY, NOVEMBER 26, 1986

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE NOV 26 1986	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS					
O	ALPHA MICROSYSTEMS	8	4	4.63	-0.1	-2.6
O	ALTOS COMPUTER SYS	19	10	10.88	+0.8	+7.4
A	AMDAHL CORP	23	12	21.88	+1.1	+5.4
O	APOLLO COMPUTER INC	18	9	14.00	+2.1	+17.9
O	APPLE COMPUTER INC	40	19	40.25	+5.3	+15.0
N	AT&T	27	21	27.00	+1.5	+5.9
O	C P T CORP	7	3	3.25	+0.0	+0.0
N	COMPAQ COMPUTER CORP	19	12	19.13	+2.6	+15.9
A	COMPUTER CONSOLES INC	12	6	8.88	+0.1	+1.4
O	CONCURRENT COMP CORP	25	1	16.00	+0.5	+3.2
N	CONTROL DATA CORP	29	18	25.75	+0.4	+1.5
O	CONVERGENT TECH	14	4	6.38	+0.4	+6.3
N	CRAY RESH INC	100	57	74.50	+3.3	+4.6
O	DAISY SYS CORP	32	8	9.38	+0.5	+5.6
N	DATA GEN CORP	50	25	33.25	+2.3	+7.3
N	DATAPOINT CORP	9	5	7.38	-0.4	-4.8
N	DIGITAL EQUIP CORP	107	58	105.50	+7.0	+7.1
N	FLOATING POINT SYS INC	46	11	12.50	-0.3	-2.0
N	GOULD INC	34	15	18.88	+1.4	+7.9
N	HARRIS CORP	37	26	30.50	-0.8	-2.4
N	HEWLETT PACKARD CO	50	34	44.50	+3.9	+9.5
N	HONEYWELL INC	87	62	70.38	+1.3	+1.8
N	IBM	162	119	127.13	+4.1	+3.4
O	IPL SYS INC	4	1	2.50	+0.3	+11.1
N	ITT CORP	60	33	55.00	+3.0	+5.8
N	M A COM INC	19	12	12.88	+0.8	+6.2
N	MATSUSHITA ELEC INDL LTD	118	57	115.00	+7.1	+6.6
O	MENTOR GRAPHICS CORP	21	11	17.13	+1.0	+6.2
N	NBI INC	14	8	10.25	+0.0	+0.0
N	NCR CORP	57	37	48.88	+5.1	+11.7
N	PRIME COMPUTER INC	28	16	17.63	+1.5	+9.3
O	STRATUS COMPUTER	26	17	21.00	+2.0	+10.5
O	SYMBOLICS INC	16	4	4.38	-0.1	-2.8
O	TANDEM COMPUTERS INC	40	18	37.75	+4.0	+11.9
N	TANDY CORP	45	31	42.50	+2.3	+5.6
N	TEXAS INSTRS INC	148	101	118.88	+3.6	+3.1
A	ULTIMATE CORP	35	13	17.38	+0.4	+2.2
N	UNISYS	81	58	80.00	+1.1	+1.4
A	WANG LABS INC - B	23	11	12.63	+0.9	+7.4
A	WANG LABS INC - C	23	11	12.50	+0.9	+7.5
N	XEROX CORP	72	49	59.75	+3.0	+5.3
	SUPPLIES & ACCESSORIES					
N	AMER BUSINESS PRODS	37	23	23.88	-0.9	-3.5
N	BARRY WRIGHT CORP	25	14	15.13	+0.5	+3.4
A	DUPLEX PRODS INC	23	18	19.00	+0.3	+1.3
N	ENNIS BUSINESS FORMS INC	28	20	25.25	+0.3	+1.0
N	3M CO	116	82	113.00	+6.5	+6.1
N	MOORE LTD	28	19	20.63	+0.5	+2.5
O	STANDARD REGISTER CO	50	32	36.00	+1.5	+4.3
N	WALLACE COMPUTER SVCS	50	37	40.38	-1.1	-2.7

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON;
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER; S=SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE NOV 26 1986	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & DP SERVICES					
O	ADVANCED COMP TECH	7	4	4.63	-0.1	-2.6
N	ADVANCED SYS INC	19	12	15.50	+0.8	+5.1
N	AGS COMPUTERS INC	25	17	25.25	+1.5	+6.3
O	AMERICAN MGMT SYS INC	20	11	19.50	+1.5	+8.3
O	AMERICAN SOFTWARE INC	16	9	15.00	+0.4	+2.6
N	ANACOMP INC	7	3	3.88	+0.4	+10.7
O	ANALYSTS INTL CORP	10	4	8.25	-0.1	-1.5
O	ASHTON TATE	46	16	46.00	+5.4	+13.2
O	ASK COMPUTER SYS INC	15	9	11.88	-1.0	-7.8
O	ASTRADYNE COMP IND	3	1	2.31	+0.0	-1.3
N	AUTOMATIC DATA PROC	39	28	36.25	+2.0	+5.8
O	BOOLE & BABBAGE INC	7	4	6.00	+0.3	+4.3
O	COMPUTER ASSOC INTL INC	25	14	22.75	+0.0	+0.0
O	COMPUTER HORIZONS CORP	15	10	10.50	-0.1	-1.2
O	COMPUTER NETWORK TECH	10	3	4.31	+0.1	+1.5
N	COMPUTER SCIENCES CORP	41	28	41.00	+3.8	+10.1
O	COMPUTER TASK GROUP INC	19	11	12.50	+0.0	+0.0
O	COMPUTONE SYS INC	6	0	0.44	-0.1	-12.4
O	COMSHARE INC	16	10	14.25	+0.3	+1.8
N	CULLINET SOFTWARE INC	20	6	8.50	+0.8	+9.7
O	CYCARE SYS INC	17	8	8.50	-0.1	-1.4
O	DUQUESNE SYS INC	33	14	34.75	+3.0	+9.4
N	GENERAL ELEC CO	84	64	83.75	+8.0	+10.6
N	GENERAL MTRS CORP	50	30	31.38	-0.1	-0.4
O	HOGAN SYS INC	12	6	11.38	+0.9	+8.3
O	INFORMATION SCIENCES INC	4	1	1.75	-0.1	-6.7
O	INFOTRON SYS CORP	19	8	10.75	+0.5	+4.9
O	KEANE INC	16	6	6.00	+0.0	+0.0
N	LOGICON INC	43	23	25.00	+1.4	+5.8
O	LOTUS DEV CORP	55	20	55.25	+7.8	+16.3
O	MANAGEMENT SCI AMER	16	10	12.88	+0.3	+2.0
O	MCI COMM CORP	13	6	6.63	+0.3	+3.9
O	MICOM SYS INC	23	10	13.50	+1.3	+10.2
O	MICRO PRO INTL CORP	4	2	2.25	+0.2	+9.1
O	MICROSOFT CORP	51	26	51.00	+9.0	+21.4
O	NATIONAL DATA CORP	26	16	21.50	+0.3	+1.2
O	ON LINE SOFTWARE INT	16	7	13.25	+0.3	+1.9
O	ORACLE SYS CORP	29	13	21.63	+2.6	+13.8
N	PANSOPHIC SYS INC	36	22	27.50	-2.0	-6.8
O	POLICY MGMT SYS CORP	24	15	22.50	+2.8	+13.9
O	PROGRAMMING & SYS INC	11	8	9.00	+0.1	+1.4
O	REYNOLDS & REYNOLDS CO	42	23	28.25	+0.8	+2.7
O	SCIENTIFIC COMPUTERS INC	6	4	4.63	-0.6	-10.9
O	SEI CORP	28	15	19.00	-0.3	-1.3
O	SHARED MED SYS CORP	41	29	37.63	+0.5	+1.3
O	SOFTWARE AG SYSTEMS INC	22	15	15.25	+0.0	+0.0
O	SOFTWARE PUBG CORP	10	5	8.38	+0.4	+4.7
A	STERLING SOFTWARE INC	21	9	14.88	+1.0	+7.2
N	SUNGUARD DATA SYSTEMS	16	10	12.50	+0.0	+0.0
N	UCCEL CORP	26	14	25.25	+2.1	+9.2
N	URS CORP	18	10	17.88	+0.8	+4.4
O	VM SOFTWARE INC	32	18	28.50	+0.5	+1.8
	SEMICONDUCTORS					
N	ADVANCED MICRO DEV	34	13	15.75	+0.5	+3.3
N	ANALOG DEVICES INC	25	14	15.50	+0.5	+3.3
O	ANALOGIC CORP	16	10	11.00	+1.0	+10.0
N	APPLIED MAGNETICS CORP	20	13	16.38	+0.8	+4.8
O	AVANTEK INC	23	15	15.50	+0.0	+0.0
O	HADCO CORP	7	3	3.75	+0.0	+0.0
O	INTEL CORP	32	16	22.25	+2.3	+11.3
O	MICRO MASK INC	7	2	3.00	+0.4	+14.3
N	MOTOROLA INC	50	34	38.38	+2.6	+7.3
N	NATIONAL SEMICONDUCTOR	16	8	11.50	+1.0	+9.5
N	TERADYNE INC	30	16	17.50	+1.6	+10.2

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE NOV 26 1986	WEEK NET CHNGE	WEEK PCT CHNGE
	PERIPHERALS & SUBSYSTEMS					
A	AM INTL INC	9	5	6.25	+0.4	+6.4
A	ANDERSON JACOBSON INC	3	1	1.44	-0.2	-11.5
O	AST RESH INC	33	11	11.75	+0.8	+6.8
O	AUTOTROL CORP	10	6	5.75	-0.3	-4.2
O	AVANT GARDE COMPUTING	7	3	4.25	-0.3	-5.6
O	BANCTEC INC	13	6	9.50	+0.1	+1.3
N	BOLT BERANEK & NEWMAN	48	32	43.00	+2.0	+4.9
A	CETEC CORP	9	5	5.63	+0.0	+0.0
A	COGNITRONICS CORP	6	2	2.50	+0.3	+11.1
N	COMPUGRAPHIC CORP	29	16	19.75	+0.8	+3.9
N	COMPUTERVISION CORP	19	10	15.13	+1.0	+7.1
N	CONRAC CORP	18	13	13.38	+0.3	+1.9
A	DATAPRODUCTS CORP	18	12	11.88	-0.4	-3.1
A	DATARAM CORP	18	7	7.00	+0.1	+1.8
O	DATA SWITCH CORP	9	5	6.50	+0.1	+2.0
O	DATUM INC	7	4	4.88	-0.1	-2.5
N	DECISION INDS CORP	15	8	9.63	+0.4	+4.1
O	EMC CORP	8	3	6.25	-0.1	-2.0
O	ENDATA INC	18	8	16.25	+0.3	+1.6
O	EVANS & SUTHERLAND	29	18	26.50	+0.5	+1.9
N	FLOATING POINT SYS INC	46	11	12.50	-0.3	-2.0
O	GANDALF TECHNOLOGIES	8	5	6.50	+0.0	+0.0
N	GENERAL DATACOMM IND	15	8	8.75	+0.1	+1.4
N	HAZELTINE CORP	30	16	29.88	+0.3	+0.8
O	ICOT CORP	13	7	9.25	-0.1	-1.3
O	INFORMATION INTL INC	18	12	14.25	+0.0	+0.0
O	INTECOM INC	7	3	5.31	+0.0	+0.0
O	INTERLEAF INC	15	8	10.50	-0.5	-4.5
O	MEGADATA CORP	5	2	2.75	+0.1	+4.8
A	MSI DATA CORP	14	8	12.00	-0.1	-1.0
N	NASHUA CORP	28	13	23.25	+0.6	+2.8
O	NETWORK SYS CORP	25	10	11.75	-0.1	-1.1
N	NORTH AMERN PHILIPS CORP	48	35	39.13	+0.0	+0.0
N	NORTHERN TELECOM LTD	38	25	32.00	+0.9	+2.8
O	NOVELL INC	26	14	25.25	+1.8	+7.4
N	PARADYNE CORP	11	4	4.88	+0.0	+0.0
A	PENRIL CORP	9	4	4.38	-0.4	-7.9
N	PLESSEY PLC	38	22	24.25	+0.3	+1.0
O	PRINTRONIX INC	15	11	11.88	+0.0	+0.0
O	QMS INC	16	9	14.38	+0.5	+3.6
O	RAMTEK CORP	7	3	5.00	+0.1	+2.6
N	RECOGNITION EQUIP INC	17	10	12.38	+0.1	+1.0
O	SCAN TRON CORP	19	10	14.75	-0.4	-2.5
N	SCIENTIFIC ATLANTA INC	15	9	10.13	+0.9	+9.5
O	SEAGATE TECHNOLOGY	19	6	18.00	+0.8	+4.3
N	STORAGE TECHNOLOGY	7	2	2.75	+0.3	+10.0
O	SUN MICROSYSTEM INC	22	11	21.38	+3.4	+18.8
A	T-BAR INC	8	5	7.63	+0.8	+10.9
A	TAB PRODS CO	15	11	12.00	-0.3	-2.0
O	TANDON CORP	8	2	3.13	+0.2	+6.4
A	TEC INC	7	3	3.63	-0.1	-3.3
N	TEKTRONIX INC	70	51	67.75	+3.9	+6.1
O	TELEVIDEO SYS INC	4	2	2.25	+0.1	+5.9
N	TELEX CORP	69	52	67.13	+5.0	+8.0
N	TIMEPLEX INC	24	14	21.38	+1.8	+8.9
N	TITAN CORP	12	7	6.50	+0.0	+0.0
O	VISUAL TECHNOLOGY INC	1	0	0.41	-0.2	-31.5
O	WYSE TECH	19	11	14.75	+0.5	+3.5
	LEASING COMPANIES					
N	COMDISCO INC	25	12	18.00	+1.3	+7.5
N	CONTINENTAL INFO SYS	12	6	8.75	+0.4	+4.5
O	FINALCO GROUP INC	5	2	2.50	+0.1	+2.5
O	PHOENIX AMERN INC	6	3	4.00	-0.3	-5.9
O	SELECTERM INC	12	5	5.50	+0.0	+0.0
N	U.S. LEASING	46	35	45.25	+0.3	+0.6

COMPUTER INDUSTRY

INSIDE

Nynex, awaiting deregulation, is quietly preparing for telecommunications software mart/**108**

Japan spreads tentacles in worldwide economic development/**110**

IBM wins lucrative order from Japanese/**112**

INSTANT ANALYSIS

"IBM management is now more concerned with profitability than with size and market share."

— **Frederic H. Cohen and Walter J. Winnitzki, L. F. Rothschild, Unterberg Towbin, Inc. analysts, in a report on IBM.**

Modem firms fight Hayes

Rally against 2% royalty fee charged by company

By James A. Martin

Competitors in the microcomputer modem industry are beginning to team up in hopes of fighting what they see as invalid technology patents held by Hayes Microcomputer Products, Inc. and Bizcomp Corp. along with a royalty fee recently imposed by industry leader Hayes.

Some 50 representatives of microcomputer modem vendors held a closely guarded meeting during the recent Comdex/Fall '86 in Las Vegas to discuss how to fight the 2% royalty fee that Hayes has requested from vendors of modems claiming Hayes compatibility.

Hayes said it would institute the fee as a result of a patent it received in 1985 for its modems with improved escape sequence with guard time, a technical feature that most compatible modems offer [CW, Nov. 10].

Another industry concern is the outcome of the long-standing legal battle between Bizcomp, a Sunnyvale, Calif., modem manufacturer, and two other vendors, U.S. Robotics, Inc. in Skokie, Ill., and Prometheus Products, Inc. in Fremont, Calif.

The validity of Bizcomp's autodialing patent was questioned by U.S. Robotics, Prometheus, Racal-Vadic, Inc. and others claiming that the technology existed years before Bizcomp's patent.

The outcome of the litigation could have strong ramifications in the Hayes royalty controversy as well. If Bizcomp's patent is ruled invalid, Hayes' patent, and the company's right to charge royalties, may become more likely to face a legal challenge.

The Bizcomp case is scheduled for trial in U.S. District Court in San Francisco in June 1987, according to the U.S. Robotics counsel.

"We feel pretty unanimously that these are junk patents," said a modem vendor representative, who asked not to be identified. "Even if they are valid, they only

See **MODEM** page 132

GM attempt to sell EDS to AT&T seen as cost-cutting move

By Alan Alper

General Motors Corp.'s reported effort to sell all or part of its Electronic Data Systems Corp. (EDS) unit to AT&T came at a time when the giant auto maker is seeking ways to cut costs and reflects the culture clash between EDS and its parent, analysts said last week.

While EDS remains vital to GM's plan to use computer technology as a strategic weapon against a growing base of international competitors, the auto maker is believed to be seeking ways to defray its cost of ownership of EDS, some analysts said. Offering a stake in the Dallas company to AT&T was said to be one way of achieving this.

The culture clash between the firms has been evident ever since GM acquired EDS

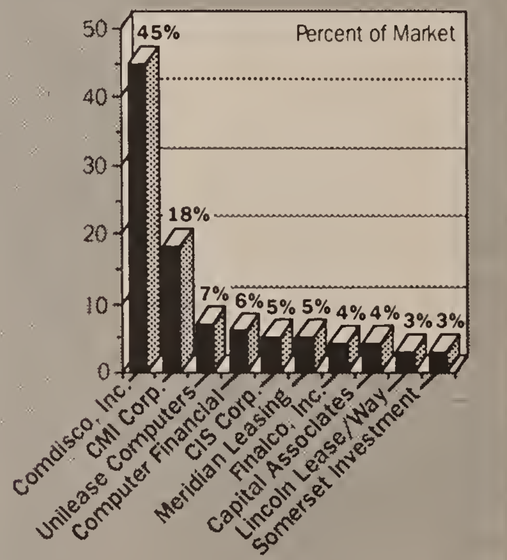
See **GM** page 132

DATA VIEW

MITCHELL J. HAYES

Leasing market

The top 10 leading independent computer lessors



Figures represent percentage of total lease revenue of top 10 lessors, Jan.-Aug. 1986

Computer Intelligence estimates, based on Uniform Commercial Code Initial Financial Filing data

INDUSTRY INSIGHT
Clinton Wilder

Fred Wang: Can he do it?

The youngest member of the ranks of leading computer vendor presidents has just inherited one of the industry's biggest challenges.

From just about any perspective, Fred Wang, who recently turned 36, has his work cut out for him. To reach this major step in his accession to the top of Wang Laboratories, Inc., he has clearly proven himself in the eyes of his father, An Wang. Now he has the chance he always wanted: To prove himself in the eyes of others within Wang, and more importantly, in the eyes of Wang customers.

His detractors like to say that users still blame him for the fiasco of delivery delays after Wang's infamous October 1983 barrage of product announcements. But a small, unscientific sampling of user thoughts does not bear that out.

Instead, the customers, perhaps confounding the skeptics, seem generally optimistic about Fred Wang's leadership. At the very least, most people feel more comfortable that the succession, long a topic of rumors and speculation, has finally taken place.

Both the industry and the MIS community will be watching Fred Wang carefully. Because along with the reins of the $2 billion company, "the Doctor" has given his eldest son a long laundry list of matters to be addressed — by yesterday, if not sooner. A small sampling:

1. Revive a waivering bottom line that, after showing signs of life earlier in 1986, plunged $30 million into the

See **FRED** page 115

Wilder is Computerworld's *senior editor, computer industry.*

Seattle fights for DOS rights

By Peggy Watt

SEATTLE — Testimony is expected to be heard this week in a legal challenge to software industry giant Microsoft Corp.'s monopoly on MS-DOS, the operating system that is at the core of millions of IBM Personal Computers and compatible systems.

At issue are a sales contract and licensing agreement drawn in July 1981. At that time, Seattle Computer Products, Inc. designed and sold 86-DOS to then-fledgling Microsoft for $50,000 and some licensing rights.

Currently, Seattle Computer is down to two employees, and Microsoft disputes whether the company can sell the license along with its other assets.

King County Superior Court Judge Gerald M. Shellan recently ruled on pretrial motions. Shellan said that Seattle Computer had the right to transfer the rights to 86-DOS and to "updates, enhancements and revisions" that are the "lawful descendants" of that original operating system, according to court documents.

A jury that was being impaneled last week will decide whether MS-DOS 3.1, 3.2, 4.0 and future versions are descendants that are therefore covered by the judge's ruling.

Seattle Computer's preliminary negotiations with a hardware vendor, mentioned in court documents, indicate the firm is willing to sell the licensing rights for considerably less than Microsoft charges to license the operating system.

A letter from Rod Brock, president

See **SEATTLE** page 132

Bell South buys Dataserv for $96.5 million in stock

By Clinton Wilder

In another bold move by a regional holding company into the computer business, Bell South Corp. last week announced an agreement to acquire third-party computer maintenance and leasing firm Dataserv, Inc. for $96.5 million in stock.

Dataserv, based in Eden Prairie, Minn., is the seventh-largest independent computer maintenance firm with maintenance revenue estimated at $50 million in 1986, according to industry consultant D. R. MacNaughton of Business Development International in Franklin Lakes, N.J.

Dataserv specializes in large IBM systems and also conducts business in spare parts, computer refurbishing and computer leasing. Dataserv has about 1,000 employees and recorded total sales of $139 million in 1985.

Atlanta-based Bell South's move closely mirrors Bell Atlantic Corp.'s 1985 acquisition of maintenance-market leader Sorbus, Inc., for $175 million. Bell Atlantic also recently acquired the computer leasing unit of Greyhound Corp.

Bell South Enterprises President W. O. McCoy said Dataserv's management team will remain with the company. The acquisition is subject to approval by Dataserv shareholders, who will vote on the action in a special meeting.

OUR NEW COMPUTER LEASING COMPANY WAS FIFTH IN THE INDUSTRY BEFORE THE PAINT WAS DRY.

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Leasing financed more than $93 billion worth of equipment across America last year, making it the preferred source of capital for acquiring equipment.

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We're one of the largest in computer leasing, and in the top 10 in overall equipment leasing.

So if you're considering any kind of equipment, consider your options first. For our informative booklet, or to contact someone directly, call us toll-free.

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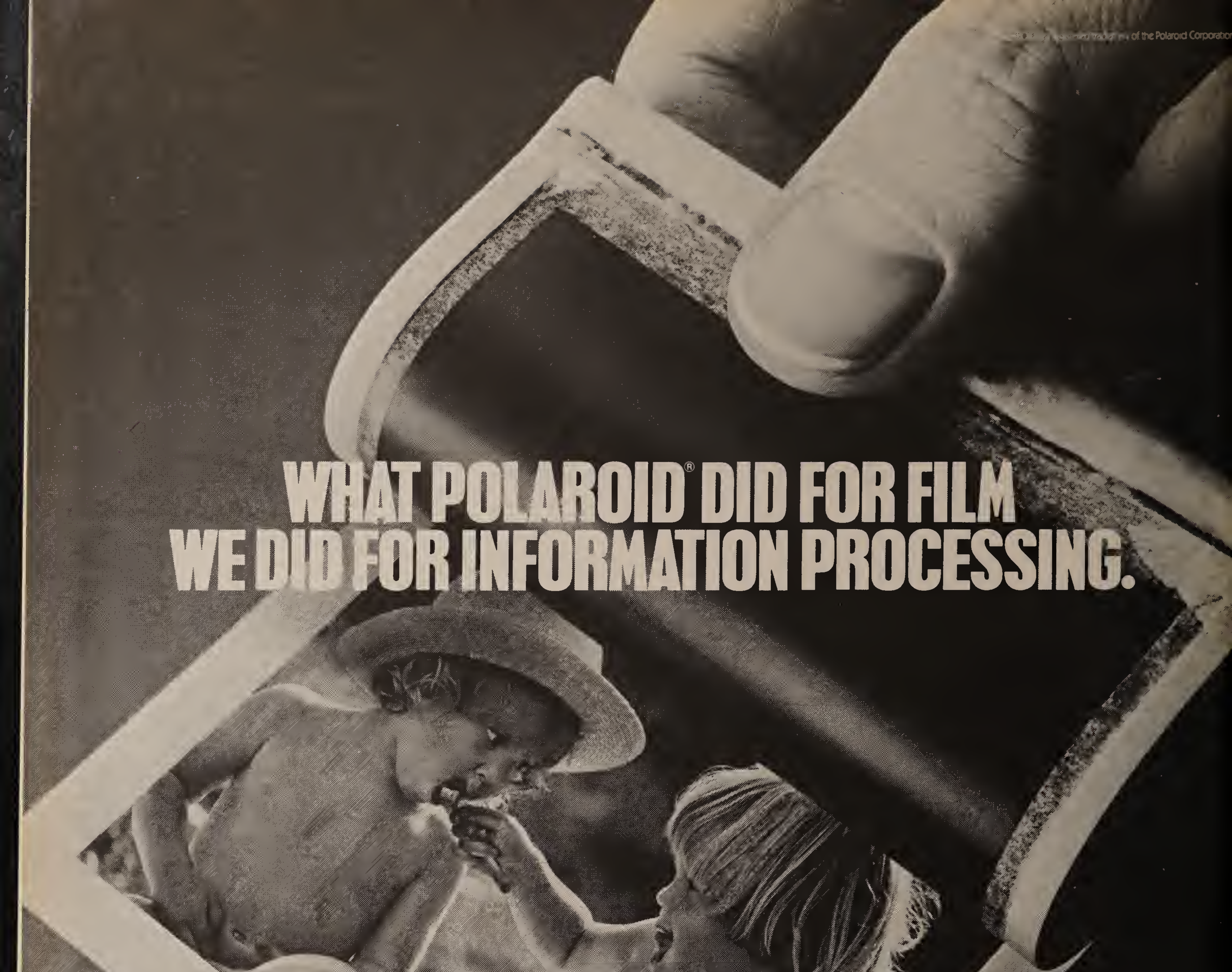
Bell Atlantic TriCon Leasing 1-800-526-4672

Bell Atlantic
Capital Corp.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